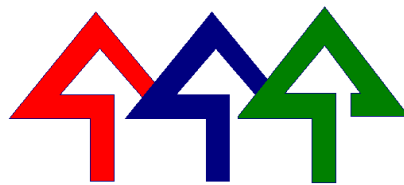


**Snohomish County
Shoreline Management Program
Grant No. G0400121 (Task 11)**



Restoration Element

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Prepared by

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Department of Planning and Development Services

and

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Table of Contents

I. Background	5
II. Shoreline Ecological Functions	5
Table 1. Shoreline Ecological Functions.....	6
Table 2: Comparison of SMA, WRIA and Critical Area Functions.....	8
Multifaceted Approach to Protect Shoreline Ecological Functions.....	10
III. Restoration Planning and Priorities	11
Shoreline Management Plan Restoration Goals and Policies	11
Shoreline Inventory of Sites with the Potential for Restoration	14
Table 3. Shoreline Functions, Restoration Objectives and Opportunities	17
Restoration Opportunities by Location.....	19
Levels of Watershed Planning and Restoration Implementation	21
Table 4. Multiple Levels of Restoration Planning and Implementation of Restoration Opportunities	22
WRIA-Based Salmon Conservation Plans	23
STILLAGUAMISH RIVER BASIN (WRIA 5).....	24
SNOHOMISH RIVER BASIN (WRIA 7).....	26
LAKE WASHINGTON-CEDAR-SAMMAMISH RIVER BASIN (WRIA 8)	28
SKAGIT, SAUK, AND SUIATTLE RIVER BASINS (WRIA 4)	29
IV. Restoration Projects.....	31
Capital Restoration Projects.....	32
Six-Year Detailed Capital Improvement Program – 2008 through 2013.....	32
Table 5: Restoration Project List – Detailed Capital Improvement Plan 2008 – 2013*	35
Future Priority Projects	38
Table 6: Restoration Projects for Future Consideration.....	39
V. Other Restoration and Preservation Programs	66
Regulatory Programs.....	66
Non-Regulatory Programs.....	67
Planning and Intergovernmental Coordination.....	67
Public Education and Stewardship	67
Incentive Programs.....	69
Purchase and Acquisition.....	70
Monitoring and Adaptive Management	70
Table 7. Monitoring Program Ecological Indicators	72
VI. Timelines, Priorities and Funding.....	73
Table 8. Restoration Six-Year Capital Improvement Plan 2008 - 2013	76
Table 9. Potential Funding Groups for Shoreline Restoration	78
VII. Maps 1 - 12	80
Appendix A: Restoration Needs & Opportunities by Shoreline Planning Segment (Data Table).....	82
Appendix B: 2010-2015 Detailed Capital Improvement Program.....	96
Appendix C: Snohomish County Marine Resources Program	101
Appendix D: Drainage Needs and Water Quality Programs.....	107

Restoration Element

I. Background

The Washington Department of Ecology adopted the 2003 Shoreline Management Act Guidelines as Part III of WAC 173-26, effective January 17, 2004. The new Guidelines direct local government review and updates of shoreline master programs. A significant feature of the Guidelines is the requirement that local governments include within their shoreline master program, a “real and meaningful” strategy to address restoration of shorelines (i.e., the restoration element or plan). The guidelines require that local governments consider and address degraded areas and potential restoration sites, restoration goals and priorities, existing and proposed projects, timelines and benchmarks, and funding sources.

Restoration is broadly used in this document to mean re-establishment, rehabilitation, or enhancement of the shoreline ecological environment.¹ Shoreline restoration and enhancement should improve, preserve, protect and restore ecological functions and processes necessary to maintain shoreline natural resources, protect public health and safety, and preserve beneficial uses of the shoreline. The policies, goals, and priorities contained in this element relate to one of these categories.

In establishing a hierarchy of preferred uses of shorelines, the Guidelines assign the highest priority to reserving appropriate areas for protecting and restoring ecological functions to control pollution and prevent damage to the natural environment and public health (WAC 173-26-201(2)(d)(i)). The goal is to achieve “no net loss” of shoreline ecological functions. The Guidelines recognize that this goal, along with the other goals of the SMA, may not be achievable through regulation alone (WAC 173-26-186(5)). Restoration programs play a key role on the plus side of the ecological equation.

II. Shoreline Ecological Functions

Shoreline ecological functions are defined in WAC 173-26-201. These functions are the processes at work which sustain the environmental conditions. These functional processes are a combination of the environmental elements of soil, water, plants, terrain and weather working together to produce natural dynamic ecological systems. Key processes include flow and storage of surface and ground water; exchange between ground and surface waters; transport and deposition of sediments; filtration and uptake of sediments, nutrients and toxic

¹ These terms are defined in *Wetlands in Washington State Vol. 2: Guidance for Protecting and Managing Wetlands* (Publication #05-06-008, Appendix A pg. 17-18, WDOE April 2005).

compounds; shading and temperature control; recruitment of large woody debris and the creation of habitat diversity.

Table 1 summarizes the shoreline ecological functions from WAC 173-26-201. The functions are described for each type of shoreline area: rivers, streams and floodplains; wetlands; lakes; marine waters; and riparian areas.

Table 1. Shoreline Ecological Functions

Shoreline Area	SHORELINE MANAGEMENT ACT Shoreline Ecological Functions [WAC 173-26-201(3)(d)(i)(C)]
Rivers, streams and associated floodplains	<p>Hydrologic: Transport of water and sediment across the natural range of flow variability; attenuating flow energy; developing pools, riffles, gravel bars, recruitment and transport of large woody debris and other organic material.</p> <p>Habitat for native aquatic and shoreline-dependent birds, invertebrates, mammals; amphibians; and anadromous and resident native fish.</p>
Wetlands	<p>Hydrologic: Storing water and sediment, attenuating wave energy, removing excessive nutrients and toxic compounds, recruiting woody debris and other organic material.</p> <p>Habitat for aquatic and shoreline-dependent birds, invertebrates, mammals; amphibians; and anadromous and resident native fish.</p>
Lakes	<p>Hydrologic: Storing water and sediment, attenuating wave energy, removing excessive nutrients and toxic compounds, recruitment of large woody debris and other organic material.</p> <p>Habitat for aquatic and shoreline-dependent birds, invertebrates, mammals; amphibians; and anadromous and resident native fish:</p>
Marine waters	<p>Hydrologic: Transporting and stabilizing sediment, attenuating wave and tidal energy, removing excessive nutrients and toxic compounds; recruitment, redistribution and reduction of woody debris and other organic material.</p> <p>Habitat for aquatic and shoreline-dependent birds, invertebrates, mammals; amphibians; and anadromous and resident native fish.</p>
Hyporheic zone and riparian vegetation	<p>Shoreline vegetation: Maintaining temperature; removing excessive nutrients and toxic compound, sediment removal and soil/bank stabilization; attenuation of flow, wave or flood energy; and provision of large woody debris and other organic matter.</p> <p>Hyporheic functions: Removing excessive nutrients and toxic compound, water storage, support of vegetation, sediment storage, and maintenance of base flows.</p> <p>Habitat functions may include, but are not limited to, space or conditions for reproduction, resting, hiding and migration; and food production and delivery.</p>

The restoration goals under the SMA include restoration of the shoreline ecological functions. These functions are defined in WAC 173-26-201 and are summarized in Table 1 above. In comparison, the Water Resource Inventory Areas (WRIA) plans focus on the functions necessary for salmon recovery. When these functional goals are compared, it is apparent that both efforts seek to restore the same environmental functions. The health of the native salmon species populations is an indicator of overall watershed health.

Table 2 shows the direct overlap of the shoreline ecological functions under the SMA with the ecological functions necessary to support healthy salmon habitat and the functions identified in the Best Available Science (BAS) for critical areas. Restoration planning clearly focuses on the same functions – with the SMA focusing on jurisdictional shorelines and the WRIA plans and BAS taking a larger watershed approach. Efforts to restore healthy salmon populations focus on the same functions needed to restore healthy shoreline ecological conditions.

Table 2: Comparison of SMA, WRIA and Critical Area Functions

Ecological Function Category	SMA Ecological Functions by Shoreline Jurisdictional Area	Salmon Recovery Functions (WRIA)	Critical Area Functions (Best Available Science)
Hydrologic Functions	<p>Streams and rivers: Transport of water and sediment across the natural range of flow variability; attenuating flow energy; developing pools, riffles, gravel bars; recruitment and transport of large woody debris and other organic material.</p> <p>Lakes and Wetlands: Storing water and sediment, attenuating wave energy; recruiting woody debris and other organic material.</p> <p>Marine waters: Transporting and stabilizing sediment, attenuating wave and tidal energy, recruitment, redistribution and reduction of woody debris and other organic material.</p> <p>Floodplains and Riparian areas: Water storage, hyporheic exchange and maintenance of base flows; attenuation of flow energy.</p>	<p>Streams and rivers: Natural sediment transport and deposition to create spawning habitat; attenuation of flow energy and creation of side- and off-channel habitat for juveniles; recruitment and transport of LWD to create pools, riffles and habitat complexity.</p> <p>Lakes and Wetlands: Water storage and sediment removal to support habitat and maintain stream flows</p> <p>Marine waters: Marine hydrologic processes support near-shore habitat for juvenile salmon and prey species.</p> <p>Floodplains and Riparian areas: Water storage, hyporheic exchange and maintenance of base flows; attenuation of flow energy and refuge during flood events directly support fish habitat.</p>	<p>Streams and rivers: Transport of water, sediment, LWD and organic materials; flood water storage, attenuation and conveyance.</p> <p>Lakes and Wetlands: Water storage and sediment retention; floodwater storage, attenuation and conveyance; flow support for streams.</p> <p>Marine waters: Wind, wave and current attenuation; longshore sediment supply and transport; re-distribution of LWD and other organic materials.</p> <p>Floodplains and Riparian areas: Water storage; hyporheic exchange; groundwater recharge; floodwater storage and attenuation.</p>
Water Quality Functions	<p>Lakes, Wetlands, Marine waters and Floodplains: Removing excessive nutrients and toxic compounds.</p> <p>Riparian areas: Maintaining temperature; removing excessive nutrients and toxic</p>	<p>All water quality functions provide basic vital support to salmon.</p>	<p>Lakes, Wetlands, Marine waters and Floodplains: Sediment removal and storage; pollution assimilation.</p> <p>Riparian areas: Temperature maintenance; bank stabilization;</p>

	compounds, sediment removal and soil/bank stabilization.		pollution and sediment assimilation.
Habitat Functions	<p>Streams, rivers, lakes, wetlands, marine waters: Habitat for aquatic and shoreline-dependent birds, invertebrates, mammals; amphibians; and anadromous and resident fish; habitat creation (i.e., developing pools, riffles, gravel and sand bars, recruitment and transport of large woody debris and other organic nutrients and materials).</p> <p>Floodplains and Riparian Areas: Habitat functions may include, but are not limited to, space or conditions for reproduction, resting, hiding and migration; and food production and delivery; habitat creation and support (i.e., attenuation of flow, wave or flood energy; provision of large woody debris and other organic nutrients and materials; hyporheic exchange and maintenance of base flows.)</p>	Direct habitat provision and creation functions are basic requirements for salmon recovery as are microclimate functions necessary to support habitat for salmon prey species provided by riparian areas.	<p>Streams, rivers, lakes, wetlands, marine waters: Fish and wildlife habitat; habitat-forming functions (pools/riffles, estuary, off-channel habitat, nearshore, eel grass, etc.)</p> <p>Floodplains and Riparian areas: Habitat for water associated and riparian associated wildlife; wildlife movement corridors, noise and visual screening; large woody debris and other natural organic matter recruitment; biotic habitat; flood flow refuge for anadromous fish.</p>

Multifaceted Approach to Protect Shoreline Ecological Functions

The Shoreline Management Act and the Guidelines recognize that regulations alone may not be sufficient to achieve a balance between all the goals of the Act and that protection of shoreline ecological functions could be enhanced by employing several different regulatory and non-regulatory strategies.²

Snohomish County has adopted just such an approach applied county-wide via the comprehensive land use plan³. This multifaceted approach includes development of regulation and enforcement; planning and intergovernmental coordination; and improved protection of ecological functions and values through non-regulatory incentive based means, such as enhancement and restoration projects, public education and other voluntary activity; direct incentive programs; and monitoring and adaptive management. The County's comprehensive plan provides policies in each of these areas to direct the county's efforts to protect the natural environment of Snohomish County and to achieve the outcome of no net loss of ecological functions.

This Restoration Element describes how the County is implementing this multifaceted approach to protect and restore natural environmental conditions and achieve "no net loss" of shoreline ecological functions⁴. The County is adopting restoration goals and policies, participating in coordinated restoration planning, employing regulatory and non-regulatory programs to protect the environment and promote restoration, and funding and managing on-the-ground restoration projects often in partnership with other jurisdictions, tribes, agencies, non-profits and private citizens.

Ecological processes and functions will be monitored in order to determine whether shoreline natural resources are maintained, the effectiveness of the multifaceted approach and progress toward achieving the goal of "no net loss."

² RCW 90.58.020 and WAC 173-26-186(8)(c)

³ Snohomish County, *General Policy Plan – A Component of the GMA Comprehensive Plan*, 1995, Updated June 20, 2008, pg. NE-1 through NE-20.

⁴ The "no net loss" standard is established in WAC 173-26-186(8)(b).

III. Restoration Planning and Priorities

This Restoration Element has been prepared to fulfill requirements under the Shoreline Management Act (SMA). The SMA applies to all rivers and streams that flow at 20 cfs or greater and their associated 100-year floodplains, all lakes of at least 20 acres in size, all marine shorelines and wetlands associated with any of the aforementioned. While this includes all the larger waterbodies in the county, the SMA does not apply to all waterbodies or watercourses. However, the SMA shorelines do not function in isolation; they are physically and hydrologically connected to the larger ecological system in the Puget Sound watershed. Restoration planning takes this larger watershed approach.

Restoration planning derives from the goals, priorities and recommendations from the individual WRIA salmon conservation plans, findings of the Marine Resources Advisory Committee, Noxious Weed Control Board, Snohomish County Lake Management Program and the Drainage Needs Reports. Further, restoration planning and actions may be taken from other plans, such as Department of Ecology Total Maximum Daily Load (TMDL) plans, the Puget Sound Partnership Action Agenda, or other water quality and habitat plans and assessments. Several agencies, tribes and stakeholder groups have participated in the development of restoration plans for the watersheds in the county. While these plans include analysis and restoration planning for rivers, streams, lakes and marine shorelines that are subject to the Shoreline Management Act, they also take a much broader watershed approach and address restoration needs outside of SMA jurisdiction. If restoration efforts are to be effective, this broader ecological approach makes sense. Those resources included within SMA jurisdiction are not ecologically isolated and should not be singled out for the purposes of restoration planning.

SMP Policy:

The county should incorporate the recommendations contained in the watershed management plans and salmon conservation plans as the basis for prioritizing restoration and enhancement projects.

Shoreline Management Plan Restoration Goals and Policies

The goals and policies in this Restoration Element mirror those adopted in the Snohomish County Shoreline Management Plan (SMP). The SMP's restoration goals and policies were drafted by the Shoreline Advisory Committee, a stakeholder group organized by the county to provide policy direction for the County's SMP update. These goals and policies reflect the county's multifaceted approach to environmental protection and restoration. Policies address programs needed to implement restoration objectives as well as addressing specific ecological functions as the focus for restoration projects. Regulatory and

non-regulatory programs are discussed in more detail later in this Restoration Element. Capital projects focus on restoring natural ecological functions and processes, water quality, habitat connectivity, and native vegetation.

Goals

1. Restore and enhance shoreline natural resources.
2. Restore and enhance ecological functions and processes necessary to maintain shoreline natural resources, protect public health and safety, and preserve beneficial uses of the shoreline.
3. Strive for a net gain in ecological productivity in the nearshore, intertidal and estuarine habitat areas.
4. Restore and enhance water quality.

Policies

1. Restore and enhance priority habitat and species in shoreline areas.
2. Restore and enhance ecological functions and processes necessary to maintain shoreline natural resources, protect public health and safety, and preserve beneficial uses of the shoreline.
3. All shoreline restoration and enhancement projects should ensure that shoreline ecological functions, such as aquatic habitat, water quality, littoral drift, sediment processes, flood conveyance, and flood storage capacity are not degraded by the action.
4. Identify those areas which have a potential for restoration or enhancement of damaged ecological functions and develop standards for improvement of the conditions in those areas and provide incentives for achieving such standards.
5. Establish incentives that will provide opportunities for new development to restore or enhance impaired shoreline ecological functions.
6. Facilitate restoration and enhancement by expediting and simplifying the shoreline permit process for projects that are conducted solely for restoration and enhancement purposes, especially those that benefit critical saltwater and freshwater habitats.
7. Restoration and enhancement of shorelines should be designed using principles of landscape and conservation ecology and should restore or enhance chemical, physical, and biological watershed processes that create and sustain shoreline habitat structures and functions.
8. The county should develop acquisition and conservation easement programs directed at lands that have unique ecological values or cannot be protected by any other method.
9. Provide incentives for new development and for public and private shoreline owners to restore and enhance shoreline ecological functions and protect habitat for fish, wildlife and plants.

10. The county shall aggressively seek funding from state, federal, private and other sources to implement restoration, enhancement, and acquisition projects.
11. The county should incorporate the recommendations contained in the watershed management plans and salmon conservation plans as the basis for prioritizing restoration and enhancement projects.
12. The county shall promote innovative land use techniques, where appropriate, such as transfer and purchase of development rights and other incentives for voluntary practices.
13. Encourage public and private shoreline owners to promote the proliferation of native, noninvasive wildlife, fish and plants.
14. Non-structural approaches for shoreline restoration and enhancement should be used for shoreline stabilization instead of bulkheads or other structural stabilization measures, where feasible.
15. Shoreline enhancement or restoration should be allowed in all shoreline environments provided it accomplishes one or more of the following objectives:
 - a. Recreate or enhance shoreline conditions;
 - b. Create or enhance natural habitat; or
 - c. Implement a recommended project in the Restoration Element of the Snohomish County Shoreline Management Program.
16. Shoreline restoration and/or enhancement should use maintenance-free or low-maintenance designs, where feasible.
17. Shoreline restoration and/or enhancement should be designed to result in a natural shoreline with functions, vegetative communities and structure similar to what would historically have been found on the site or in the vicinity.
18. Projects should address habitat degradation causes rather than symptoms. Habitat enhancement activities should emphasize rehabilitation of ecological processes and functions.
19. Existing artificial structures that appear to be impeding natural recovery should be removed.
20. Beneficial long term effects of natural disturbances, such as flooding, should be preserved or restored whenever possible.
21. Isolated sloughs, side channels and wetlands should be reconnected to fish accessible waters where feasible.
22. Require habitat improvement on redevelopment projects through a combination of public and private programs and actions through regulatory and/or non-regulatory means.

Shoreline Inventory of Sites with the Potential for Restoration

Snohomish County has collected inventory data throughout its shoreline jurisdiction pursuant to the requirements of WAC 197-26-201(3)(c). Results were reported in an inventory document titled, *Summary of Shoreline Ecological Functions and Conditions in Snohomish County, 2006*. The inventory characterizes existing shoreline conditions and summarizes the health of shoreline ecological functions. Management issues are identified that are addressed in the Shoreline Management Program, and serve as an ecological baseline from which the County can measure “no net loss” of shoreline ecological functions. The inventory provides an assessment of the ecological health of individual stream, lake and marine planning segments and suggests restoration opportunities for reaches where ecological functions have been adversely impacted or are missing. The planning segments are shown on Map 1.

SMP Policy: *Identify those areas which have a potential for restoration or enhancement of damaged ecological functions and develop standards for improvement of the conditions in those areas and provide incentives for achieving such standards.*

Assessment of shoreline ecological health is based on evaluation of a set of variables acting as functional indicators. The characterization of ecological functions for each planning segment relies heavily on the indicators used in the evaluation of habitat conditions for salmonids defined by the National Marine Fisheries Service (NMFS 1996) and by various other salmon conservation documents.⁵ The ecological health of every stream, lake or marine shoreline planning segment was assessed based on the ecological indicators.⁶ This assessment of ecological health was then used to identify the appropriate shoreline environment classification and management criteria needed to protect shoreline ecological functions included in the Shoreline Management Program. The assessment also identified specific restoration needs and opportunities for each shoreline planning segment. Figure 1 illustrates the relationship between the shoreline inventory of ecological conditions, the Shoreline Management Program (SMP) and this Restoration Element.

⁵ For detailed descriptions of the indicators used in the inventory see, *Summary of Shoreline Ecological Functions and Conditions in Snohomish County, 2006*, p. II-3 through II-8.

⁶ Detailed tables and maps providing data by shoreline reach/planning segment are available in Appendix D (on CD) of the inventory. Individual planning segments are identified on inventory Maps 1A and 1B and on Map 1 in this Restoration Element.

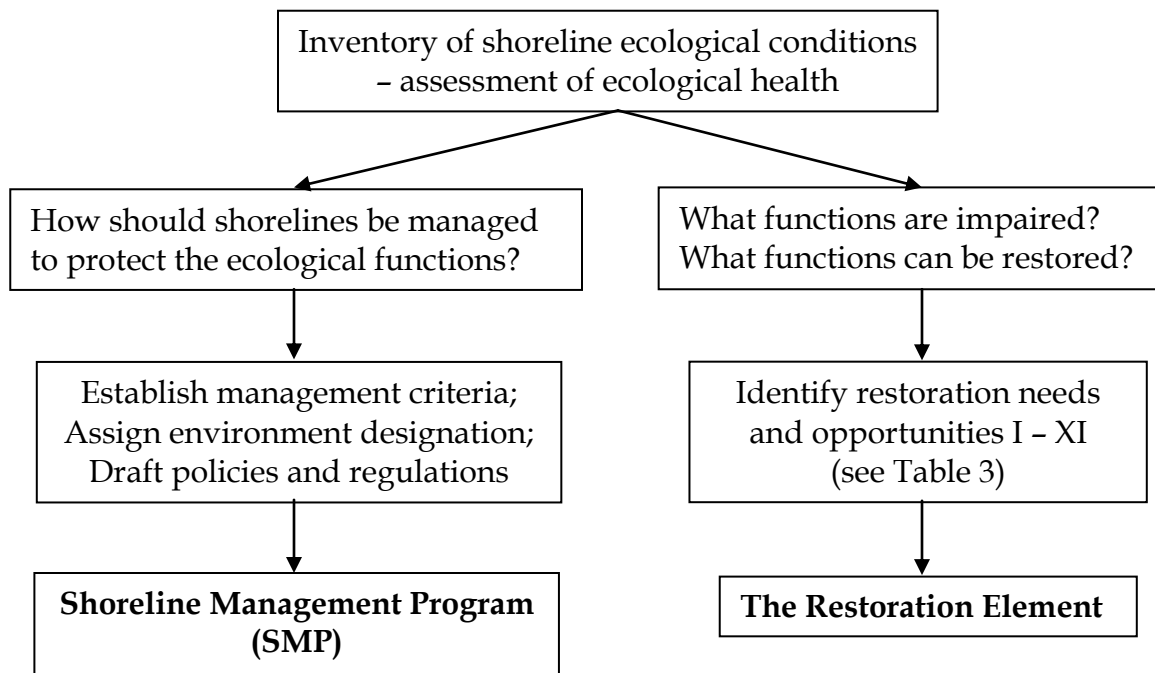


Figure 1: Relationship between the shoreline inventory, the SMP and the Restoration Element.

The ecological indicators are presented in Table 3 in relation to their associated ecological functions and restoration needs and opportunities. The restoration opportunities are coded I-XI as described in the key below. Table 3 illustrates the linkages between the shoreline ecological functions, the variables used to evaluate those functions, the types of restoration projects needed to improve or replace impaired or missing functions and the ideal ecological outcomes.

* Key to Restoration Needs and Opportunities in Table 3:	
I - Develop and maintain programs to protect and restore shoreline natural resources and functions.	Educate and provide assistance to property owners and the general public on how to protect and restore habitat and shoreline functions.
II - Restore riparian areas.	Activities include planting of riparian, aquatic and backshore vegetation and maintenance.
III - Protect and restore estuaries.	Protect existing mudflats, marshes, scrub-shrub and forested wetlands, and properties with high potential to be restored to tidal function.
IV - Add large woody debris.	Place large woody debris jams or beach logs to restore sediment, habitat and channel functions.
V - Restore channel and floodplain conditions.	Restore channel configuration, create or reconnect off-channel habitat and blind tidal channels, breach and setback dikes to restore natural floodplain and tidal functions.
VI - Protect and restore sediment processes.	Protect forest cover, treat forestry roads, remediate landslides, enhance bridges, and beach nourishment.
VII - Restore fish passage.	Replace culverts, tidegates, dams and fish ladders and other structures that impede migration.
VIII - Protect and restore wetlands.	Restore hydrology and vegetation in freshwater, estuarine and backshore wetlands.
IX - Acquire / remove shoreline structures.	Acquire and remove bulkheads, armoring, residences, marinas, piers, and other structures to restore shoreline functions.
X - Protect existing habitat.	Purchase critical and intact habitat areas outright, purchase easements, or protect through land use regulations.
XI - Invasive weed control.	Remove and prevent noxious and invasive aquatic and riparian vegetation.
Source: Snohomish County, <i>Summary of Shoreline Ecological Functions and Conditions in Snohomish County</i> , 2006, Appendix D (on CD).	

Table 3. Shoreline Functions, Restoration Objectives and Opportunities					
Shoreline Ecological Inventory			Restoration Objectives	Restoration Measures	Desired Ecological Outcomes
Shoreline Ecological Functions	Ecological Indicators	Restoration Needs and Opportunities *			
Overall Basin Health (OBH)	% Total Impervious Area (TIA)	I X IX	Preserve remaining habitat open space; limit new impervious surface; easements, purchase and acquisition; education, assistance and incentive programs; protect existing ecological conditions	Protection of existing ecological functions Multifaceted approach to include regulatory and non-regulatory programs Mitigation, restoration and enhancement to offset impacts from growth and development	"No net loss" of shoreline ecological functions
Natural Sediment Processes (NSP)	% bank armoring Feeder bluffs Road crossings	IX VI	Alternatives to hard armoring; removal of existing bank armoring; place large woody debris jams or beach logs to restore sediment, habitat and channel functions. Protect forest cover, treat forestry roads, remediate landslides, enhance bridges, and beach nourishment.	Rehabilitate forest roads where feasible Restore forest cover in landslide hazard areas and erosional areas to minimize erosion Restore wetlands between sediment source and downstream aquatic resources Implement best management practices in agricultural areas and developed areas to minimize erosion Restore stream buffers in agricultural areas and on forest lands to reduce bank erosion Remove in-water structures and replace shoreline armoring with bioengineered materials Import materials to nourish beaches Remove groins or other impediments to drift patterns Relocate developments/structures/fills that disconnect nearshore areas from upland sediment sources	Reduced fine sediment loads, turbidity, and embeddedness Improved channel morphology and instream habitat complexity Reduced egg, fry, and alevin mortality Reduced phosphorus transport Diversification of stream biota Improved/increased forage fish spawning habitat
Water Quality and Quantity (WQQ)	303d listing Wetlands	VIII I XI	Prevent point and non-point pollution; restore riparian and wetland conditions contributing to good water quality; protect and restore hydrologic processes including infiltration, groundwater, and in-stream flows; education and stewardship programs	<u>Nitrogen Delivery and Removal:</u> Restore and protect riparian vegetation in groundwater discharge areas Restore and protect riparian vegetation along headwater streams Restore and protect riparian vegetation in areas with shallow alluvium or hydric outwash conditions Restore and enhance depressional wetlands and lakes downstream of urban and agricultural lands Remove or plug ditches to increase residence time Remove dikes and/or install setback levees to restore overbank flow, hydraulic connectivity and hyporheic functions	Denitrification (break down of nitrates into N ₂ gas) Fewer shellfish closures Reduced algal blooms Improved nutrient cycling Improved invertebrate richness
				<u>Phosphorus Delivery and Removal:</u> Restore depressional wetlands on upland terraces and in erosion-prone areas Restore riparian buffers and valley bottom vegetation Re-establish stream meanders in areas of straight line hydrographic Encourage reduced fertilization of lawns, especially along lakeshores	Reduced Biological Oxygen Demand (BOD) Increased Dissolved Oxygen (DO) Reduced algal blooms
				<u>Pathogen Delivery and Removal:</u> Infiltrate surface runoff Restore depressional wetlands upstream of estuaries Use infiltration trenches with sand filters	Reduced shellfish closures Reduced algal blooms Improved nutrient cycling Improved invertebrate richness

				Reconnect and re-establish/rehabilitate floodplain wetlands to allow sediment removal Remove or plug ditches to increase residence time Restore overbank flooding in important areas above aquatic resource of concern; focus on areas that have riverine depressional wetlands (mineral soils) Replant/transplant eelgrass beds Remove/replace creosote pilings and/or beach logs	
Hydrologic connectivity, hyporheic exchange, water storage, runoff and peak flows, tidal processes (HCS)	Structures preventing connectivity to floodplain and channel migration (levees, dikes, roads, railroads, bridges, etc.) Wetlands Dock density	V III IX VII VIII	Preserve remaining functions; protect and restore hydrologic processes including infiltration, groundwater, and in-stream flows; restore channel configuration, create or reconnect off-channel habitat and blind tidal channels, breach and setback dikes to restore natural floodplain and tidal function; protect existing mudflats and estuarine marshes and properties with high potential to be restored to tidal function Limit new impediments; restore connectivity and fish passage; acquire and remove bulkheads, armoring, residences, marinas, piers, and other structures to restore shoreline function replace culvert, tidegates, dams and fish ladders and other structures that impede migration.	Restore forest cover in rain-on-snow zones Plug ditches and remove drain tiles to restore wetland hydrology in lowland areas Remove bank hardening to allow channel migration and increase stream length and sinuosity Disconnect roadside ditches from natural drainage network Retrofit urban development on permeable deposits and along stream valleys to incorporate permeable pavement, infiltration ponds/trenches, etc. Relocate development outside of floodplains Restore depressional wetlands in headwater areas Provide setback levees/dikes to improve floodplain and riverine wetland connectivity Breach/remove dikes to restore and reconnect tidal channels Manage groundwater withdrawals Remove/breach dikes to reconnect tidal channels Remove intertidal fill Remove groins, piers or other impediments to drift patterns	Improved infiltration and groundwater recharge Adequate instream flows Reduced streambank erosion Reduced scour and stream incision Improved channel morphology and instream habitat Improved habitat for wetland-dependant wetland-associated wildlife species Improved tidal flushing in estuarine habitats Improved access to rearing habitat Improved habitat complexity Increased estuarine wetland area Increased salmonid rearing/migration habitat Improved tidal flushing
Habitat and Riparian functions: habitat, water quality, organic materials and nutrients, heat and light, in-stream and near-shore habitat (HRF)	Presence and condition of riparian vegetation Wetlands LWD Pools	II XI IV III VIII XI	Protect existing riparian areas; restore riparian and wetland vegetation and connections to upland habitat; remove invasive and noxious plants; planting of riparian, aquatic and backshore vegetation, maintenance, weeding and invasive weed control. Preserve riparian areas for natural LWD recruitment; engineered structures to re-establish in-water habitat diversity Restore estuaries and near-shore areas.	Re-establish conifer stands and fast-growing hardwood species adjacent to stream Eliminate structures that minimize channel migration to increase recruitment potential via channel migration or avulsion Restore forest cover on mass wasting risk areas with the potential to deliver wood to streams Restore canopy cover in riparian and nearshore areas Plant nearshore riparian areas with native woody species Replant/transplant eelgrass beds	Improved channel complexity and habitat diversity Improved channel stability Lower stream temperatures Increased side channel formation Increased detritus inputs Improved bank stability Lower stream temperatures Increased bank cover Improved habitat for forage fish Increased forage fish spawning area Increased nutrient inputs

Restoration Opportunities by Location

Restoration Opportunity I – Education and Technical Assistance Programs

All shorelines within the county benefit from public education and technical assistance programs to both protect existing and restore impaired ecological functions. More information about these programs is included in this document under the discussion of non-regulatory programs.

Restoration Opportunity II – Riparian Restoration

As shown on Map 2, riparian restoration has been identified as a need in the major river systems where riparian vegetation has been impacted by farming and development activities: Snohomish River, French Creek, Snoqualmie River, Skykomish River, Stillaguamish River, Portage Creek, and the upper North Fork and lower South Fork Stillaguamish River. Residential development, road crossings and farming have also impacted riparian areas along Church Creek, Jim Creek, Quilceda Creek, Canyon Creek, Pilchuck River, Little Pilchuck Creek, Carpenter Creek, Woods Creek and Wallace River. Several creeks in eastern and northern Snohomish County have been impacted by logging in riparian areas. Marine shorelines along Point Wells, Picnic Point and along the shorelines of the Tulalip Reservation have also been identified as needing riparian restoration.

Restoration Opportunity III – Protect and Restore Estuaries and Tidal Functions

Estuary restoration is needed in both the Snohomish and Stillaguamish estuaries and in Tulalip Bay (Map 3).

Restoration Opportunity IV – Add Large Woody Debris

Habitat functions could be improved by adding large woody debris in shoreline segments along the North and South Fork Stillaguamish, Skykomish, and Pilchuck Rivers and the creeks in the southwest portion of the County (Map 4).

Restoration Opportunity V – Channel and Floodplain Functions

Freshwater and estuarine shorelines along the lower Stillaguamish mainstem, the North and lower South Fork Stillaguamish, lower Skykomish, Snoqualmie, Snohomish and central Pilchuck Rivers would benefit from channel and floodplain restoration (Map 5).

Restoration Opportunity VI – Sediment Processes and Beach Nourishment

Forestry, logging roads and landslides have impacted shorelines in north and east county, predominantly on tributary streams, except for two major slides: Steelhead Haven on the North Fork Stillaguamish, and Gold Basin on the South Fork Stillaguamish. In addition, other land use activities impact sediment transport, such as sizing of stream crossing culverts, additional shoreline armoring, or existing levees. Marine shorelines along the Burlington Northern Santa Fe Railroad from the County's southern border with King County to the City of Everett, the Tulalip Reservation, Warm

Beach, Picnic Point, and Hat Island would benefit from restoration of beach sedimentation processes (Map 6).

Restoration Opportunity VII – Connectivity and Restore Fish Passage

Connectivity and fish passage has been identified as a restoration need throughout sections of each watershed and is dependent on usage by specific species (e.g., listed steelhead trout utilize portions of streams with higher gradients than Chinook salmon). Connections to backshore wetlands could be restored at Priest Point and Picnic Point (Map 7).

Restoration Opportunity VIII – Wetlands

Wetlands perform important off-channel habitat, water storage, water quality and/or flow maintenance functions along several streams: Stillaguamish mainstem and Armstrong Creek, Jim Creek, Cub Creek, Quilceda Creek, Carpenter Creek, upper Woods Creek, and the creeks in SW County. John Sam Lake, Lake Stickney, Lake Stevens, Lake Cassidy, Kellog Lake and Crystal Lake all include significant wetland ecosystems (Map 8).

Restoration Opportunity IX – Connectivity and Removal of Structures

Removal of shoreline structures would restore natural hydrologic and sediment processes along the Tulalip shoreline from Mission Beach to Priest Point, Hat Island, Picnic Point, Point Wells, the lower Skykomish and Sultan Rivers, central Pilchuck, Sauk River, and Portage and French Creeks and Jorgenson Slough (Map 9).

Restoration Opportunity X – Protect Existing Habitat

Significant habitat areas have been identified throughout the eastern portion of the county, Pilchuck Creek, the Quilceda Estuary, Tulalip west shoreline to Kayak Point, and the shoreline areas of several smaller lakes. In addition, there are a few key areas in the Snohomish River Estuary that should be protected, e.g. Otter Island. (Map 10).

Restoration Opportunity XI – Removal of Noxious and Invasive Plants

Several lakes have been identified for removal of invasive aquatic plants, algae control or monitoring: Goodwin, Shoecraft, Meadow, Swartz, Stevens, Roesiger, Nina, Serene and Martha (south) (Map 11).

Most stream systems across the county have invasive plant species, including Japanese knotweed, Himalayan blackberry, and reed canarygrass.

Spartina may be found in a number of nearshore systems. Ongoing efforts continue in Port Susan Bay, outside the Stillaguamish River Estuary, while some isolated plants have been found outside the Snohomish River Estuary and along the Burlington Northern Santa Fe Railroad.

When Maps 2 through 11 are compared it becomes obvious that most shoreline planning segments have multiple restoration needs, which makes sense from an environmental perspective. Ecological functions do not operate in isolation but are part of a dynamic system where each component performs multiple functions. For example, Table 2 above demonstrates how riparian areas simultaneously contribute to hydrologic, water quality and habitat functions. Restoration of native vegetation in riparian areas can accomplish several restoration goals and is a component of most restoration projects. Appendix A contains a table showing each shoreline planning segment by name (as shown on Map 1) and all restoration opportunities I-XI that have been identified for each segment.

Restoration opportunities have been identified based on analysis of the data collected for the shoreline inventory. Data was collected pertaining to the ecological indicators (refer to Table 3 above). Assignment of restoration opportunities also considered information and priorities found in other watershed plans and drainage needs assessments, as outlined below.

Levels of Watershed Planning and Restoration Implementation

The County's restoration activities are guided by restoration planning and implementation at different levels of scope and scale, including: federal mandates and guidelines, state required planning and restoration, regional scale activities (related specifically to Puget Sound), and finally the local (i.e., County) scale.

This approach to restoration planning and implementation allows Snohomish County to:

1. Better integrate planning and implementation activities;
2. Realize synergies between and among mandates;
3. Achieve multiple benefits (e.g., flood damage reduction and salmon recovery) with each project;
4. Implement an aggressive funding strategy that maximizes grant funding for available County funds.

Table 4 below outlines the scales of restoration planning and implementation from the federal to the local level. The table includes hyperlinks to the web pages of many of these activities. Table 4 is meant for illustrative purposes only and does not fully represent the entire breadth of restoration planning. Local implementation actions (restoration) follow the Key to Restoration Needs outlined on page 14.

Table 4. Multiple Levels of Restoration Planning and Implementation of Restoration Opportunities												
Level	Restoration Planning	Local Implementation of Key Restoration Needs										
		I	II	III	IV	V	VI	VII	VIII	IX	X	XI
FEDERAL	• National Oceanic and Atmospheric Administration – National Marine Fisheries Service (Northwest Regional Office)	x										
	• U.S. Fish and Wildlife Service (Pacific Region, bull trout char)	x										
	• U.S. Environmental Protection Agency (Puget Sound in National Estuary Program)	x										
	• U.S. Environmental Protection Agency Clean Water Act (Region 10 water)	x										
STATE	• Salmon Recovery Publications (see salmon and Governor’s Salmon Recovery Office sections of RCO website)	x										
	• WA Department of Ecology Watershed Planning (instream flows and water quality)	x										
	• WA Department of Fish and Wildlife Salmon Recovery	x										
	• WA Department of Natural Resources (HCPs, Aquatic Lands Conservation Plan, climate change)	x										
REGIONAL	• Puget Sound Partnership Action Agenda											
	o Action Agenda: Priority A	x		x			x		x		x	
	o Action Agenda: Priority B	x	x	x	x	x	x	x	x	x		x
	o Action Agenda: Priority C	x		x			x		x			x
LOCAL	• Snohomish County Natural Hazards Mitigation Plan (2005)	x				x						
	• Stillaguamish River Comprehensive Flood Management Plan (2003)	x				x						
	• Snohomish River Comprehensive Flood Management Plan (1991)	x				x						
	• Sauk River Comprehensive Flood/Erosion Control Management Plan (2009)	x	x	x	x	x	x	x	x	x	x	x
	• Ground Water Management Plan for Snohomish County (1999)	x										
	• State of the Lakes Report (2003), Individual Lakes Update (2008)	x										x
	• French Creek Watershed Management Plan (2004)	x	x	x	x	x	x	x	x	x	x	x
	• Quilceda/ Allen Watershed Management Plan (2002)	x	x	x	x	x	x	x	x	x	x	x
	• Stillaguamish Watershed Action Plan (1990)	x	x	x	x	x	x	x	x	x	x	x
	• Aquatic Habitat Inventory, Assessment, and Restoration Publications (various)	x	x	x	x	x	x	x	x	x	x	x
	• Salmon Conservation Publications (various)	x	x	x	x	x	x	x	x	x	x	x
	• Stillaguamish Watershed Chinook Salmon Recovery Plan (2005)	x	x	x	x	x	x	x	x	x	x	x
	• Snohomish River Basin Salmon Conservation Plan (2005)	x	x	x	x	x	x	x	x	x	x	x
	• Snohomish, Stillaguamish, and WRIA 8 Watersheds 3-year Work Plans (available on Puget Sound Partnership Website)	x	x	x	x	x	x	x	x	x	x	x
	• Snohomish Basin Habitat Work Schedule (online salmon project database)	x	x	x	x	x	x	x	x	x	x	x
	• Stillaguamish Watershed Habitat Work Schedule (online salmon project database)	x	x	x	x	x	x	x	x	x	x	x
	• Lake Washington, Cedar, Sammamish – WRIA 8 – Habitat Work Schedule (online salmon project database)	x	x	x	x	x	x	x	x	x	x	x

WRIA-Based Salmon Conservation Plans

Watershed-Specific Restoration Goals and Priorities

WRIA stands for ‘water resource inventory area’. WRIA-based salmon conservation plans have been developed for each major watershed, following the listing of Chinook salmon and bull trout char, both in 1999. Representatives from local jurisdictions and government agencies, tribes, environmental groups, farmers, development interests, commercial enterprises and private citizens participated in development of these plans. The plans outline the actions needed to get listed salmon to recovery. Following NOAA – National Marine Fisheries Service technical guidance, the plans address the harvest, hatchery, habitat protection and habitat restoration needs to reach recovery for the entire Puget Sound Evolutionary Significant Unit (the listing scale for Chinook). Each watershed (WRIA-based) developed a local plan that addresses these needs, and in turn the 14 Puget Sound plans roll up into the Puget Sound Salmon Recovery Plan. Recovery will take 50 years; the plans address priority actions and benchmarks for 10 years.

Each plan assesses the habitat recovery needs throughout the watershed and determines the protection and restoration efforts and priorities. While these plans focus on the needs for salmon habitat, they by default also address the shoreline ecological functions. Salmon are an indicator of the overall health of the watershed and the functions necessary for productive salmon habitat are also the functions described in the requirements for shoreline protection as described in Table 2 above.

The specific goals, priorities and criteria in the WRIA-based salmon conservation Plans summarized below, by watershed, are sufficient to ensure a net gain in shoreline functions, and will be used to prioritize projects and funding for shoreline management related restoration. These WRIA plans, together with the research and advice of the Marine Resources Advisory Committee, Noxious Weed Control Board, Snohomish County Lake Management Program and the Drainage Needs Reports have been the primary drivers of local restoration planning.

While the WRIA-based salmon conservation plans provide strategic guidance and priorities for ecosystem and salmon recovery, the plans do not specifically address what specific project should happen where. To put the salmon conservation plans on a trajectory to reach the 10-year recovery benchmarks, the watersheds and Puget Sound region (Shared Strategy for Puget Sound, before it was folded into the Puget Sound Partnership in 2007) developed 3-year Work Plans. The 3-year Work Plans apply the strategies to on-the-ground assessments and projects that will protect and restore habitat, as well as how these actions will be integrated with harvest and hatchery management. The 3-year Work Plans include: a project list, a map, and a narrative that explains how the actions in the 3-year Work Plan will achieve the desired trajectory. The 3-year Work Plans include a comprehensive list of projects that could take place in each watershed, and thus is larger than what could actually be accomplished in a 3-year timeframe, providing flexibility in funding and resource allocation. Therefore, the 3-

year Work Plans also achieve multiple objectives in guiding restoration and other activities, as a funding strategy, and allow for sponsors to work on a project should landowner support (all projects are voluntary) fall through.

Watershed 3-year Work Plans are developed each year, and thus reflect changing priorities and required adaptive management actions. In addition, the 3-year Work Plans are adopted by each watershed group (after internal technical and policy review), and are reviewed by the Puget Sound Partnership (for policy) and NOAA's Puget Sound Recovery Implementation Technical Team (for technical crossover with the plans).

As part of the salmon recovery process and in partnership with the state, watersheds maintain an online database, called the [Habitat Work Schedule](#). Each watershed in the state maintains a portal that reflects the salmon recovery plan in their area. These portals outline the key priorities in the watershed, as well as the restoration activities (past, present and future) for the watershed. The Habitat Work Schedule is used in Puget Sound to develop the individual watersheds' 3-year Work Plans.

STILLAGUAMISH RIVER BASIN (WRIA 5)

Goals

The Stillaguamish Implementation Review Committee (SIRC), now known as the Stillaguamish Watershed Council, has adopted 10-year restoration goals and priorities that are described in the Stillaguamish Watershed Chinook Salmon Recovery Plan. These goals are intended to bring Chinook populations in the Stillaguamish to 30% of the Puget Sound Technical Recovery Team goal. The Stillaguamish Plan was approved by County Council Motion 05-025 on May 25, 2005, and adopted by the SIRC on June 8, 2005. The goals are:

- G1** - restore 400 acres of riparian forest;
- G2** - restore 190 acres of estuary habitat,
- G3** - create 120 acres of estuary habitat,
- G4** - place 51 engineered log jams;
- G5** - restore 30 acres of floodplain;
- G6** - remove 4.1 miles of shoreline armoring;
- G7** - construct sediment remediation projects at Steelhead Haven and Gold Basin,
- G8** - treatment of 106 miles of forest roads;
- G9** - acquire 1,445 acres to protect and increase terrestrial ecological functions, providing habitat for local wildlife.

Priorities

Criteria establishing priorities by which to evaluate habitat projects are found in the Stillaguamish Watershed Chinook Salmon Recovery Plan and the Watershed's 3-year Work Plan. Future restoration projects within the Stillaguamish Basin will continue to be evaluated and funded based on these priorities and the yearly review of the 3-year Work Plan.

The primary habitat limiting factors and the actions needed to recover Stillaguamish Chinook include:

Riparian: Plant native riparian vegetation, exclude livestock, protect existing native riparian vegetation, and control non-native invasive plants. Riparian actions are focused on restoring 400 acres of riparian forest on rural, urban, and agricultural lands that are not governed by existing private, state, or federal forest regulations within two geographic priority areas. The First Riparian Priority area includes the Upper North Fork Stillaguamish, Squire Creek, French-Segelsen, Lower Canyon Creek, and Lower South Fork Stillaguamish sub-basins. The Second Riparian Priority area includes the Middle North Fork Stillaguamish, Lower North Fork Stillaguamish, Jim Creek, and Lower Pilchuck Creek sub-basins. The plan defers to the existing regulatory framework for riparian forest management on private, state, and federal forest lands.

Estuary/Nearshore: Restore blind tidal channels and tidal marsh habitats by removing and/or setting back dikes, restore pocket estuaries, restore or enhance marine shoreline habitat by removing bulkheads and planting native vegetation, retrofit existing tide gates, and construct log jams to enhance tidal channel formation in the river delta. Estuary and marine nearshore restoration actions are focused on three primary locations. These include restoration of 115 acres of tidal marsh habitat on WDFW's Leque Island property, restoration of 80 acres of tidal marsh habitat on The Nature Conservancy's property adjacent to the mouth of Hat Slough, and creation of 120 acres of new tidal marsh habitat by placing 10 engineered log jams on the mud/sand flats in front of the mouth of Hat Slough.

Large Woody Debris: Install engineered log jams in main river channels, stabilize eroding stream banks and landslides using large wood revetments, and regenerate mature riparian trees for future instream recruitment. Specific actions to supplement large instream wood include installation of 51 engineered log jams within specific reaches of the North and South Forks. These reaches have relatively unmodified banks and are therefore expected to be more responsive to the floodplain and channel morphological effects of large instream wood.

Floodplain: Reconnect main river channels with side channels and sloughs, reconnect main river channels with floodplains and forested wetlands, remove and/or set back dikes and levees, and remove bank armoring. Specific floodplain improvements include restoration of side channel habitat in the Lower Stillaguamish, Lower North Fork Stillaguamish, Middle North Fork Stillaguamish, and Lower South Fork Stillaguamish

sub-basins. Removal of 4.1 miles of bank armoring is also prescribed for reaches above the confluence of the north and south forks of the Stillaguamish River.

Sediment: Stabilize large deep-seated landslides along main river channels using large wood revetments, decommission and treat forest roads in areas of steep and potentially unstable geology, restore wetlands to stabilize small tributary sediment regimes. Specific actions to reduce sediment impacts include remediation of the large deep-seated landslides at Steelhead Haven and Gold Basin and treatment of 106 miles of forest roads in the Upper North Fork, French-Segelsen, Deer Creek, Middle North Fork Stillaguamish, Upper Canyon Creek, Robe Valley, and Lower Canyon Creek sub-basins.

Hydrology: Restore floodplains to reduce peak flow and low flow impacts, reduce forest road density, increase hydrologically mature forest cover, identify optimum instream flow levels and actions to reduce water consumption. Riparian vegetation, floodplain, and sediment projects should also contribute to restoring and protecting hydrologic functions.

Secondary limiting factors and actions needed to recover Stillaguamish Chinook include:

Fish Passage and Barrier Removal: Reconnect habitat that has been disconnected from natural processes by anthropocentric actions such as dikes and levees, tide gates, dams, roads, and railway berms. Remove undersized and/or blocking culverts, bridges, and fishways.

Water Quality and Quantity: Take actions necessary to reduce temperature, increase dissolved oxygen and reduce fine sediment and turbidity from tributaries and mainstem reaches. Reduce the impacts of low flow on fish productivity. Ensure the Stillaguamish Instream Flow rule is fully implemented and flows protected for instream needs. Purchase water rights from landowners as they become available to supplement existing flows.

Many of these priority projects have statistics for producing more aquatic life; however these projects protect and improve riparian corridors which also provide increased wildlife habitat.

SNOHOMISH RIVER BASIN (WRIA 7)

Goals

The Snohomish Basin Salmon Recovery Forum (a multi-interest group) has a 50-year recovery vision and 10-year recovery goals. On May 25, 2005, the Snohomish County Council approved Motion 05-026 followed by adoption of the Snohomish River Basin Salmon Conservation Plan by the Forum on June 2, 2005. For the next ten years to bring listed species back on a recovery trajectory, the Forum recommends focusing recovery efforts on the estuary, nearshore and mainstems of the Snohomish, Snoqualmie and

Skykomish Rivers and minimizing habitat losses and making habitat gains through restoration in the remaining basins. The needed 10-year habitat gains are:

- G1** - restore one mile of nearshore beaches and shoreline,
- G2** - restore 1,237 acres of tidal marsh;
- G3** - restore 10.4 miles of mainstem edge habitat;
- G4** - restore 56 acres of mainstem riparian habitat;
- G5** - restore 167 acres of mainstem off-channel habitat;
- G6** - construct 41 new log jams on mainstem rivers;
- G7** - restore 6 acres of riparian habitat on second tier mainstem rivers;
- G8** - restore 6 acres of off-channel habitat on second tier mainstem rivers;
- G9** - restore 13 acres of riparian forest in rural streams;
- G10** - restore 51 acres of off-channel habitat in rural streams;
- G11** - restore 75 acres of riparian forest in urban streams

Priorities

Criteria establishing priorities by which to evaluate habitat projects are found in the Snohomish River Basin Salmon Conservation Plan and the Basin's 3-year Work Plan. Future restoration projects within the Snohomish Basin will continue to be evaluated and funded based on these priorities and the yearly review of the 3-year Work Plans. While the Plan recommends that all sub-basins must achieve some recovery, the Forum's focus results in an allocation of effort as follows: 80% of capital funding for projects in the estuary, nearshore and mainstems, 15% for projects on the lowland tributaries, and 5% to efforts in the headwaters.

Projects are prioritized first by location in the basin, then by project action, then by capacity to complete the project:

- Locational priorities:
 - Top: Nearshore, estuary, mainstem
 - Middle: Lowland tributaries (rural streams, urban streams)
 - Low: Headwaters (below natural barriers, above natural barriers)
- Project actions are prioritized based on location in the basin and on whether the focus is on preservation or restoration:
 - Preservation
 - Restore shoreline conditions
 - Restore sediment processes
 - Riparian enhancement
 - Re-connect off-channel habitats
 - Restore fish passage / remove human-made barriers
 - Restore tidal exchange
 - Restore hydrologic processes
 - Protect/ restore water quality
 - Control invasive species

- Enhance instream structures

Priority restoration areas for salmonids in the Snohomish Basin are: the Marine Nearshore, Snohomish Estuary, Snohomish Mainstem, Skykomish Mainstem, Lower Sultan River, Lower Snoqualmie, and Middle Pilchuck River .

Modeling has shown that the greatest gains in fish populations will occur due to removal of bank armoring, floodplain/estuary reconnection, and riparian planting.

LAKE WASHINGTON-CEDAR-SAMMAMISH RIVER BASIN (WRIA 8)

The WRIA 8 Salmon Recovery Council adopted the Final WRIA 8 Chinook Salmon Conservation Plan in 2005, which outlines priority actions for the next 10 years in the Short List of projects, which if implemented will put the basin on a trajectory to meet the 50-year recovery goals for the Chinook salmon populations. The priority areas are defined as: fish passage and protection of existing riparian habitat areas, floodplain and wetlands are the primary recommended project types in the Swamp Creek, North Creek, and Little Bear Creek subbasins. The Lake Washington/Cedar/Sammamish Watershed Chinook Salmon Conservation Plan was approved by Motion 05-034 on June 29, 2005.

Priorities

Criteria establishing priorities by which to evaluate habitat projects are found in the Final WRIA 8 Chinook Salmon Conservation Plan and the Basin's 3-year Work Plan. Future restoration projects within WRIA 8 will continue to be evaluated and funded based on these priorities and the yearly review of the 3-year Work Plans. Watershed-wide priorities include protecting forests, reducing impervious surfaces, managing stormwater flows, protecting and improving water quality, conserving water and protecting and restoring vegetation along streambanks.

An assessment of the relative risk to the long-term viability of WRIA 8 Chinook salmon determined that all three Chinook salmon populations are at extremely high risk of extinction. Consequently, habitat actions, in coordination with actions by harvest and hatchery managers, are needed to address all three populations. The Technical Committee has hypothesized that the Cedar population is at the highest relative risk (because of steeply declining abundance trends), followed by the North Lake Washington population, then Issaquah. Therefore, the conservation strategy recommends that actions focus on areas used by the Cedar Chinook population as first priority, followed by the North Lake Washington population, and then Issaquah.

The Watershed Evaluation divided areas used by each of the three populations into *tiers*, based on relative watershed conditions and Chinook abundance and use. In general, Tier 1 subareas have the relatively highest quality habitat and highest fish abundance and/or use, while Tier 3 subareas have the relatively most degraded habitat

and infrequent Chinook use. Actions in Tier 1 subareas generally are higher priority than Tier 2, but Tier 2 actions are needed in many subareas to expand the Chinook populations spatially over the long term to reduce the risk posed by having key life stages such as spawning and rearing occur in only one stream or stream segment. In addition, actions are needed at the landscape scale to protect and restore watershed processes that create and maintain Chinook habitat for all life stages. Therefore, it is essential that land use and public outreach actions are implemented in all three tiers. In general, actions recommended for the Tier 1 subareas should protect and restore remaining high quality habitat and related processes, Tier 2 actions should focus on protecting remaining habitat as well as restoring habitat to Tier 1 conditions, and Tier 3 actions should focus on maintaining and restoring water quality and natural hydrologic processes (stormwater and instream flows).

WRIA 8 has identified a relatively higher risk for the Cedar Chinook population due to the higher proportion of natural origin spawners. The naturally spawning sub-population has low abundance and low productivity, and actions are necessary in the near-term to secure this population from any increase in extinction risk. Actions are also necessary to ensure that the habitat potential exists to support recovery in the future as population productivity increases and the distribution expands into the Tier 2 North Lake Washington tributaries (e.g. Little Bear and North Creeks). This requires programmatic actions to maintain and restore landscape level processes at risk from development as well as capital projects to acquire functioning habitat or restore degraded habitats. These acquisitions include headwater areas in Upper Bear Creek, Cottage/Cold Creek, Little Bear Creek, and North Creek to maintain forest cover, water quality, and hydrologic processes.

Site specific projects in the Plan are identified and prioritized for all Tier 1 and 2 subareas. Land use and public outreach actions are provided for all tiers, including Tier 3. Actions are presented in two forms: “comprehensive lists” of 1,200 actions that can be used by implementers at any time to identify and carry out actions, and a much shorter “start-list” of 170 priority actions on which regional funding and analysis (e.g., the treatment phase of EDT) will focus during the first ten years of Plan implementation. These lists will evolve through the adaptive management process based on monitoring results and new science.

Link to WRIA 8 plan:

<http://www.govlink.org/watersheds/8/planning/chinook-conservation-plan.aspx>

SKAGIT, SAUK, AND SUIATTLE RIVER BASINS (WRIA 4)

Priority areas are not defined in the portions of WRIA 3 and 4 which are located in Snohomish County in either the Skagit Watershed Council Habitat Protection and

Restoration Strategy (1998) or the WRIA 3 and 4 Limiting Factor Analysis. The Town of Darrington Draft Restoration Plan has noted that, due to relatively undeveloped natural shoreline, floodplain and floodway areas, conservation through purchase of easements or other tools may be a priority in these reaches.

Given the relative health of the Sauk and Suiattle Rivers, the rivers' designations as wild and scenic, and the low level of human development, most actions in these basins are tied to protection measures. To this end, Snohomish County completed the Sauk River Flood/Erosion Control Management Plan. This Plan highlights the very dynamic nature of these rivers and outlines key areas of channel migration, sediment aggradation/degradation and where potential restoration or mitigation measures might take place. The Plan also outlines where bank controls (shoreline armoring) would be inappropriate given the power of the rivers, highlighting these areas where flood buyouts might make sense.

Priorities

Infrastructure, particularly along Highway 530 continues to degrade habitat and inhibit channel migration. Any activity that inhibits channel migration would tend to exacerbate bank instability, erosion and habitat degradation.

Sauk River Sub basin

The Sauk River sub basin includes two independent chinook salmon populations: lower Sauk summer chinook and upper Sauk spring chinook. The Sauk River has been a key area for protection projects in the Skagit watershed. Protection efforts will continue to focus on the spawning areas for summer chinook and diverse rearing habitat for spring chinook located on the main stem Sauk between the confluence of the Suiattle River and the town of Darrington. This sub basin also provides important spawning and rearing habitat to steelhead and bull trout. Partner organizations involved in habitat protections projects in this sub basin include The Nature Conservancy, Seattle City Light, and U.S. Forest Service. The restoration projects in the three-year plan are sediment reduction projects. High sediment loads are a major threat to salmonid populations and habitat quality in the Sauk sub basin.

Suiattle River Sub basin

The Suiattle River possesses one of the three independent spring chinook populations in the Skagit watershed. This sub basin provides is extensively used as spawning and rearing habitat by bull trout and steelhead. Glaciers in the upper watershed result in high levels of flow variability as well as high sediment loads to this system. Sediment resulting from forest land-management impacts combined with major flooding events in recent year represents the major threat to chinook, bull trout, and steelhead populations in this sub basin. For this

reason, the restoration projects included in the three-year plan focus of sediment reduction. Partner organizations that have been involved in protection and restoration actions in this sub basin include the U.S. Forest Service, Skagit River System Cooperative, Sauk-Suiattle River Tribe, The Nature Conservancy, and Seattle City Light.

IV. Restoration Projects

The individual WRIA salmon conservation plans, research and advice of the Marine Resources Advisory Committee (see Appendix C), Noxious Weed Control Board, Snohomish County Lake Management Program and the Drainage Needs Reports (see Appendix D) have all identified a number of proposed restoration projects. Implementation and construction of these proposed restoration projects are carried out by the respective county, municipalities, or tribes identified as the lead for the proposed restoration projects. Other organizations and individuals are also involved in restoration. These include the Tulalip and Stillaguamish Tribes, the Snohomish Conservation District, the Cascade Land Conservancy, the Stilly-Snohomish Fisheries Enhancement Task Force, other non-profit organizations, and private landowners. In addition, State and Federal agencies such as the Washington State Department of Fish and Wildlife, the US Fish and Wildlife Service, and others may be involved in direct project implementation, or as partners in multi-jurisdictional efforts. Within Snohomish County, the Department of Public Works, Surface Water Management Division, is the lead for implementing, designing, and constructing proposed restoration projects.

As a measure of all activity in the watersheds, the Habitat Work Schedule online database provides an overview of the priorities for recovery in each watershed among all project sponsors. This database is used each year to generate the project list and map portions of each watersheds' 3-year Work Plan, which is a prioritized list of projects that could take place in the next three years to move the watershed on a trajectory to meet its 10-year recovery benchmarks. Again, the 3-year Work Plans are reviewed (technical and policy) and adopted at the local and regional levels. Further information may be found in the portals for Snohomish County watersheds linked below, as well as the Puget Sound Partnership's Salmon Recovery 3-year Work Plans webpage, also linked below.

- [Stillaguamish Watershed Habitat Work Schedule Portal](#)
- [Snohomish Basin Habitat Work Schedule Portal](#)
- [WRIA 8 Habitat Work Schedule Portal](#)
- [Puget Sound Partnership 3-year Work Plan webpage](#)

Capital Restoration Projects

This restoration element represents the framework for implementation of restoration projects in the shoreline environment. The programs and projects referenced in the following sections will likely be modified in the future, or new plans will be developed. In fact, one of the keys to success in efforts such as salmon conservation will be adaptive management, a tool that will help measure success and allow the restoration strategy to be adjusted accordingly. This element of the Shoreline Management Program, therefore, is an indicator of the scope and breadth of restoration actions anticipated in the County, recognizing that new or modified plans may be developed in the future.

The restoration projects are divided into two categories: those included in the six-year detailed capital improvement program (CIP) and those identified as priorities for future inclusion in the capital plan and fundraising appropriations. Projects that make it on to the 6-year CIP have been synthesized from the various restoration planning efforts (Figure 2).

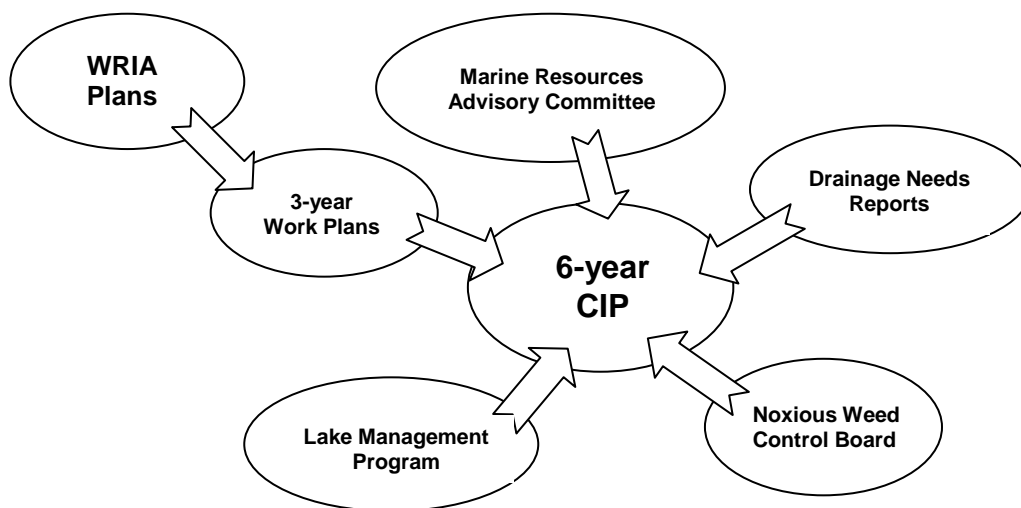


Figure 2. Planning Efforts Contributing to the 6-Year Detailed Capital Improvement Program

Six-Year Detailed Capital Improvement Program – 2008 through 2013

The Surface Water Management, Habitat and Rivers CIP – Six-Year Detailed Improvement Program identifies restoration projects that are being designed, constructed, or under construction during the six-year period from 2008 through 2013. The Snohomish County Council must approve funding for all projects through the normal budgetary cycle.

Ninety projects have been identified in Table 5. These projects include planning and design, overall project management, countywide programs and restoration materials,

and monitoring projects as well as seventy-five location-specific restoration programs and projects.

The projects in Table 5 have been identified as the top priorities for the time period 2008-2013. Projects that get included in the capital improvement program have passed through a complex process involving funding, political support, inter-agency coordination, work planning and budget assessment. If any one of these elements is lacking, the project does not make the list. Poor ecological conditions and the need for restoration do not alone ensure that a project can be completed. Project prioritization is based on:

- The ability to secure funding. Grant funding often dictates the types of projects which qualify for the awards. The ability to secure funding and matching grant funds is also driven by locally adopted budgets and political priorities - both the county's and the project partners'. Rules for the utilization of grant or mitigation funds may also dictate the timing, type and location of restoration projects.
- The ability to obtain political sponsorship, provide project management, implementation and monitoring, and/or to secure and support project partners. Work programs must be balanced to ensure that enough of the right people are available to complete the project from conception and design through implementation and monitoring.
- Coordination with other projects that improves efficiency by addressing location and timing issues or by utilizing similar designs, materials, equipment or expertise. Coordination may also improve the effectiveness of the restoration efforts, for example, bank stabilization upstream to improve the outcome for fish habitat restoration downstream. Opportunities for project coordination may also help to secure the participation and cooperation with landowners and project partners vital for project implementation and long-term success.
- Need for damage repair and alleviation of emergency situations such as, protection and stabilization of public infrastructure, public safety and damage prevention.
- Priority projects identified in WRIA plans, 3-year Work Plans or Drainage Needs Reports. As already discussed in this Restoration Element, each of these planning efforts establishes its own criteria for ranking project priorities. Prioritization of future projects (listed in Table 6) will also consider results from the monitoring program evaluating the county's progress in meeting the "no net loss" standard for shoreline and critical area ecological functions.

In Table 5, restoration programs and projects have been grouped by type and location. The functional focus of each program or project is also identified. Rarely does a project focus on a single function and, given the interplay between functions in natural systems, a single project may simultaneously restore several functions. For example, restoration of river hydrology can restore natural channels, reconnect off-channel areas, restore natural sediment transport and deposition, reduce flooding impacts and improve habitat quality. In addition, most restoration projects also include riparian restoration with native plant species which can help attenuate flow, filter sediments and impurities, help control water temperature and provide nutrients, habitat and woody debris. Many culvert replacement projects are designed to improve fish passage but have the added benefits of improving flow and sediment processes and reducing flood damages. Most culvert projects also include replacement of native vegetation improving riparian and habitat functions.

SMP Policies:

Projects should address habitat degradation causes rather than symptoms. Habitat enhancement activities should emphasize rehabilitation of ecological processes and functions.

Existing artificial structures that appear to be impeding natural recovery should be removed.

Beneficial long term effects of natural disturbances, such as flooding, should be preserved or restored whenever possible.

Isolated sloughs, side channels and wetlands should be reconnected to fish accessible waters where feasible.

The locations of the projects in Table 5 are shown on Map 12. Map 12 can be compared to Maps 1-11 to link actual projects with the restoration opportunities identified in the shoreline inventory. Project ID numbers also correspond to the budget information in Table 8. For the “watershed specific restoration projects” in Table 5, the abbreviations in the “functions” column relates back the shoreline ecological functions identified in the first column of Table 3.

Table 5: Restoration Project List - Detailed Capital Improvement Plan 2008 - 2013*			
ID # (Map 12)	Project ID# (see Table 8*)	Project Name	Functions
GENERAL COUNTYWIDE PROJECTS			
Project Planning, Design and Management			
	WA361	Preliminary Design & 6 Yr Plan Development	design
	WA7226	River Project Feasibility & Preliminary Design	design
	WA9299	Admin. & OH, Major River CIP	mgmt
	WA399	Admin. & OH, Stream Enhancement CIP	mgmt
	WA354	CIP Program Management	mgmt
Countywide Projects and Materials			
	WA9225	CIP Salmon Plan Implementation	habitat
	J11306	WMA Property Management	habitat
	WA7220	Beaver Management	habitat
	DIP024	MDP Habitat Restoration Implementation	habitat
	WA362	Native Plant Restoration Projects	habitat
	WA7215	Restoration Materials	habitat
	WA9212	Riparian Improvements	habitat
	E131	Habitat Projects Database	habitat
Monitoring and Maintenance			
	WA9226	Monitoring - Restoration Project Establishment	monitor
	J11307	Project Monitoring and Maintenance	monitor
57		Lake Serene aq plants	lake restore
58		Lake Goodwin aq plants	lake restore
59		Lake Shoecraft aq plants	lake restore
60		Lake Loma algae	lake restore
61		Lake Roesiger aq plants	lake restore
62		Lake Cassidy algae	lake restore
63		Lake Ketchum algae	lake restore
64		Martha Lake (south) aq plants	lake restore
65		Meadow Lake aq plants	lake restore
66		Lake Swartz aq plants	lake restore
WATERSHED-SPECIFIC RESTORATION PROJECTS			
Lake Stevens			
20	113new1	Lake Stevens DNR Habitat Projects (2008)	habitat
34	113new1	Lake Stevens DNR Habitat Projects (2009)	habitat
46	WA8560	Lundeen Creek	habitat/connect.
Lake Washington / South County			
31	J11303	Brightwater Habitat Mitigation	mitigation

11	WA359	Brightwater culvert design (S. Co. Fish Passage)	mitigation
30	WA391	Brightwater Fisher Pond Habitat Improvement	mitigation
32	J11304	Brightwater Culvert Replacement	mitigation
43	J11303	BW - Little Bear Fens	mitigation
44	J11303	BW - Little Bear Head Waters	mitigation
45		Cutthroat Creek	connectivity
71	WA381	Alpine Rockeries Little Bear Crk	habitat
69	DIP030	Mill Crk/Tambark DNR Habitat Implementation	habitat
2	WA8561	North Creek School (Tambark DNR & Grant) (2008)	habitat
33	WA8561	North Creek School Habitat Restoration (2009)	habitat
Marine and Estuary			
53		Creosote log removal	marine
51		Jetty Is. beach restore	marine
50		Kayak Pt. Park	marine
26	JE130MS	Marine Shoreline Stabilization Pilot Project	marine
52		Osprey nest relocate	marine
75	SEP2	Develop Partnerships - Estuary Partnerships	estuary
74	SEP1	Estuary Restoration Construction Seed	estuary
19	WA9222	Snohomish Estuary Edge Enhancements	estuary
73	E1324	Snohomish Estuary Mainstem Connectivity	estuary
1	WA9206	Snohomish Estuary Tidal Marsh (Smith Island)	estuary
76		Nature Conservancy restoration project	estuary
Skykomish Sub-basin			
14	WA369	Creswell Cr Culverts/Channels	connectivity
25	E1327	Prop. Mgmt Skyview	habitat
16	New132	Skykomish Reach Analysis	River hydro
17	WA9218	Skykomish Braided Reach Design	River hydro
39	E1323	Skykomish Braided Reach, Phase II	River hydro
22	E1322	Shingleboat Slough	River hydro
12	WA9003	Cooperative Bank Stabilization	sedimentation
42	CEIA	Sustainable Ag Community Flood Fencing	sediment/flood
41	WA9011	Flood Control Structures	flood
Snohomish Sub-basin			
67	DIP025	Salmon Restoration - Snohomish	habitat
70	DIP031	Fish Passage - Snohomish	connectivity
35		Dubuque Creek Culvert Replacements	connectivity
54		Fales Rd/culvert	connectivity
29		Kuhlman Creek - Culvert Replacements	connectivity
47	J11305	Mosher Creek	connectivity
8	J11301	Pilchuck Barrier Inventory	connectivity
13	WA365	Snohomish Fish Blockage Culvert	connectivity
18	WA9219	Snohomish Confluence Restoration Grant	River hydro
10	WA9005	Bank Stabilization Support To Roads	sedimentation

40		Bob Heirman Park Flood Repair	flood/habitat
9	WA7200	DD6 Maintenance	flood
24	E1326	Ebey Slough/Everett Dike Configuration	flood
Stillaguamish Basin			
68	DIP026	Salmon Restoration - Stillaguamish	habitat
72	WA539	Stillaguamish Discretionary Fund Projects	habitat
28		Stewardship Design - Stillaguamish	habitat
5	J11302	Design Steward Projects	habitat
55		Smoke Farm - acquisition	habitat
27	E133	Big Four Culvert Replacement	connectivity
56		Church Creek fish passage	connectivity
37		County Road Fish Blockage Culvert	connectivity
36		Jarsk Creek Culvert Replacement	connectivity
48	WA9202	North meander	connectivity
49	WA9224	South meander	connectivity
4	WA358	Stilly Fish Passage Culvert	connectivity
21	WA5XX	NF Big Trees	LWD
38		South Fork Stillaguamish ELJ	LWD
3	WA5XY	Stilly Big Trees	LWD
23	E1325	Stilly SF ELJ Siting and Design	LWD
15	New1301	North Fork Stilly Landslide Steelhead Dr	sedimentation
6	WA9011	Flood Control Structures	flood

* 6-year CIP budget information from the 2008-2013 Detailed Capital Improvement Plan Projects can be found in Table 8 for projects showing an ID# in Table 5 above.

Note: Updated project list, budget table and map for 2010-2015 are included in Appendix C.

Future Priority Projects

The second category of potential restoration projects includes additional projects and programs needed to achieve local restoration goals as identified by: the WRIA salmon conservation plans; projects identified by the planning efforts of the Marine Resources Advisory Committee, and projects identified by Snohomish County's Drainage Needs Reports. These various sources have identified numerous proposed restoration projects and areas with potential for restoration. As projects move from conceptual to active, they are moved to the watershed 3-year Work Plans to further refine the projects initial scope, then to tie to priorities within each watershed and advance in sequencing of like projects (e.g., a mainstem river project one year, with another in a subsequent year). As funding opportunities arise, these proposed restoration projects could be incorporated into the SWM Habitat and Rivers CIP 6-Year Detailed Improvement Program.

Table 6 is arranged by WRIA and provides project names and descriptions, partners for implementation, narrative location of the project, and source document from which the project was proposed. For more detailed information about any restoration project, please refer to the original source document. Primary source documents include the Marine Resources Advisory Committee, North Lake Washington Basin Salmon Conservation Plan, Snohomish River Basin Salmon Conservation Plan, Appendix L – Project Ideas & Opportunities to the Snohomish River Basin Salmon Conservation Plan, the Stillaguamish Implementation Review Committee (SIRC), Stillaguamish Chinook Salmon Conservation Plan, and Drainage Needs Reports. In Table 6, Projects highlighted in red text are higher priority as indicated by their inclusion in the six-year CIP in Tables 5 and 8.

Table 6: Restoration Projects for Future Consideration

WRIA 8 - Lake Washington Drainages	
Nearshore Restoration Projects	
City of Mukilteo's Riparian Vegetation Enhancement	DESCRIPTION: The City of Mukilteo has identified priority properties for a near shore riparian revegetation enhancement program. Work will be done using volunteer labor. Potential locations for riparian revegetation: Edgewater Creek, Japanese Creek and Tank Farm, Lighthouse Park, Big Gulch Creek, Shipwreck/Hulk Creek, Picnic Point Creek/Park, Lund's Gulch/Meadowdale Park. See more detail on each location in list below.
	LOCATION: Nearshore Area – Reach 8: Mukilteo St Park to Picnic Point
	PARTNERS: City of Mukilteo
	SOURCE: Nearshore/Estuary Chinook Population – Tier I – Initial Habitat Project List
Mukilteo Lighthouse Park	DESCRIPTION: Enhance the beach profile and marine riparian conditions by removing or setting back the existing park facilities along the shoreline and planting native marine riparian vegetation with limited access points to the beach. Southern near shore of park has good intact eelgrass beds. Potential study site to explore feasibility of riparian beach restoration. Little potential for overhanging riparian vegetation due to close proximity to railroad. Marine riparian vegetation is limited to small patches of Nootka rose, dune rye grass, and gumweed. While a good pilot project, project does not address the factors of decline for Chinook.
	LOCATION: Near shore Area – Reach 8: Mukilteo St Park to Picnic Point
	PARTNERS: City of Mukilteo
	SOURCE: Marine Resources Advisory Committee, Nearshore/Estuary Chinook Population – Tier I – Initial Habitat Project List
Nakeeta Beach Home Acquisition	DESCRIPTION: Restore the site by purchasing the fee simple property rights for all of the parcels and removing the houses, fill, and sea wall. A lifetime estate arrangement would allow the property owners to continue living on the site. Restoration work could not start until the residents vacated their properties. Nakeeta Beach is a residential community built on top of approximately two acres of the upper intertidal zone of the western Mukilteo shoreline. The site includes ten houses that are protected by a nearly continuous concrete sea wall. Residential sewage is disposed of through on-site septic systems. The southernmost parcel within the site is undeveloped. Approximately half of the houses are occupied year-round and the others are summer homes.
	LOCATION: Nearshore Area – Reach 8: Mukilteo St Park to Picnic Point
	PARTNERS: City of Mukilteo
	SOURCE: Marine Resources Advisory Committee, Nearshore / Estuary Chinook Population – Tier I – Initial Habitat Project List
City of Mukilteo Tideland and Shoreline Acquisitions	DESCRIPTION: The City of Mukilteo is evaluating the nearshore within its jurisdiction for additional potential tideland acquisition and shoreline habitat protection projects, as opportunities present themselves especially adjacent or between publicly owned lands and tidelands.
	LOCATION: Nearshore Area – Reach 8: Mukilteo St Park to Picnic Point
	PARTNERS: City of Mukilteo
	SOURCE: Nearshore / Estuary Chinook Population – Tier I – Initial Habitat Project List
Big Gulch Culvert Replacement	DESCRIPTION: Replacement of the undersized culvert under the railroad, with a trestle system to restore system connectivity and improve sediment transport into the near shore. Concerns exist about toxics in the upstream portion of the Big Gulch system. The headwaters of Big Gulch Creek drain the western portion of Paine Field Airport. Chemical spills near Paine Field in 1993, 1996, and 2000 resulted in downstream fish kills. Concerns were also raised about drainage problems upstream that could complicate the project. It was recommended that the project be coordinated with the next project if it is done.
	LOCATION: Nearshore Area – Sub-Reach 8.05: Big Gulch
	PARTNERS: City of Mukilteo, Olympic Terrace Sewer District
	SOURCE: Marine Resources Advisory Committee, Nearshore / Estuary Chinook Population – Tier I – Initial Habitat Project List
Big Gulch High-Flow Bypass and Restoration	DESCRIPTION: A Highflow bypass has been proposed by Snohomish County, Mukilteo and the local sewer district to address drainage and related erosion problems in the basin. Riparian restoration (improving near shore habitat around the Big Gulch Creek outfall by adding sediment along the seaward side of the railroad to recreate a beach profile that will support marine riparian vegetation) has been proposed to accompany this project. Project feasibility study and planning are underway.

	LOCATION: Nearshore Area – Sub-Reach 8.05: Big Gulch
	PARTNERS: Snohomish County, City of Mukilteo, Olympic Terrace Sewer District
	SOURCE: Nearshore / Estuary Chinook Population – Tier I – Initial Habitat Project List
Shipwreck/Hulk Creek Restoration	DESCRIPTION: Work with the property owners to enhance the marine riparian vegetation at the site. This would increase the amount of shade for potential forage fish spawning in the upper intertidal zone. Property is currently privately owned, with approximately 1,000 ft. of shoreline restoration potential. Site holds high potential for marine riparian vegetation restoration/enhancement. A mid-sized backshore area supports some marine riparian vegetation and there appears to be potential for enhancement with additional native planting. Eelgrass extends from this site to the north. Need to explore feasibility of removing ship hulks at site. Potential exists for contamination issues related to old shipyard on site.
	LOCATION: Nearshore Area – Sub-Reach 8.05: Big Gulch
	PARTNERS: Snohomish County, Private
	SOURCE: Nearshore / Estuary Chinook Population – Tier I – Initial Habitat Project List
Shipwreck/Hulk Creek Acquisition	DESCRIPTION: Acquisition and restoration of former shipyard site. Property is currently privately owned. Approximately 1,000 ft. of shoreline restoration potential. A lifetime estate arrangement would allow the property owners to continue living on the site while ensuring its preservation and enhancement of marine riparian vegetation. If acquired, site holds high potential for marine riparian vegetation restoration/enhancement. A mid-sized backshore area supports some marine riparian vegetation and there appears to be potential for enhancement with additional native planting. Eelgrass extends from this site to the north. Need to explore feasibility of removing ship hulks at site. Potential exists for contamination issues related to old shipyard on site. Do planting, weed control and some interpretive materials on the shoreline side of the railroad tracks. Project will address approx. 1,200 ft. of shoreline. Snohomish County MRC Project Underway (fully funded). Site has existing value for juvenile Chinook.
	LOCATION: Nearshore Area – Sub-Reach 8.05: Big Gulch
	PARTNERS: Snohomish County
	SOURCE: Nearshore / Estuary Chinook Population – Tier I – Initial Habitat Project List
Picnic Point Culvert Replacement	DESCRIPTION: Replacement of the existing culvert under the railroad with a trestle to restore connectivity and improve sediment transport from the uplands. Project may also benefit fish passage. Many drainage/slope stability problems exist in the drainage as identified by Snohomish County plan. Site currently hosts quite a bit of sediment deposition from the creek, but could be improved with the installation of the trestle. Two artificial fish passage barriers upstream from the park have been identified. The Snohomish County MRC project at Picnic Point will shed some light on the flooding and sedimentation problem at the upstream end of the railroad culverts.
	LOCATION: Nearshore Area – Reach 9: Picnic Point to Edwards Point
	PARTNERS: Snohomish County
	SOURCE: Nearshore / Estuary Chinook Population – Tier I – Initial Habitat Project List
Lunds Gulch Culvert Improvement and Riparian Enhancement	DESCRIPTION: Project could take several forms. One option would be to implement Snohomish County's plan to replace the existing box culvert beneath the railroad with a wider box culvert as described in the Puget Sound Tributaries Drainage Needs Report. This project plan also includes riparian vegetation enhancement above and below the culvert, creation of an off-channel pond in the park, and placement of large woody debris in the pond. A second project option would be to replace the existing box culvert with a trestle to restore connectivity, improve sediment transport, and reduce flow-dependent fish passage problems.
	LOCATION: Nearshore Area – Sub-Reach 9.04: Lunds Gulch
	PARTNERS: Snohomish County
	SOURCE: Nearshore / Estuary Chinook Population – Tier I – Initial Habitat Project List
Meadowdale Marina Acquisition and Removal	DESCRIPTION: Acquire and remove the dilapidated marina structure. The site is a total of 2.17 acres, with the buildings and wharfs representing approx. 1.7 acres of over-water structures. Current owner would like to re-build the property and turn it into a retail shopping mall, but this is inconsistent with Edmonds Shoreline Master Program. One of the largest remaining over-water structures in the WRIA 8 near shore. Feasibility uncertain due to landowner unwillingness. Potential concern over contamination issues during demolition. Dense eelgrass beds are located north and south of the structure. The marine near shore habitat impacts of this structure include shading within a productive eelgrass area and potential interference with juvenile salmon migration and foraging along the shoreline. Removal of marina structures may also have positive effects on longshore drift of sediment. Timing may be good for approaching landowner before re-development begins.

	LOCATION: Nearshore Area – Sub-Reach 9.04: Lunds Gulch
	PARTNERS: City of Edmonds
	SOURCE: Nearshore / Estuary Chinook Population – Tier I – Initial Habitat Project List
Shell Creek Beach Nourishment	DESCRIPTION: Conduct beach nourishment activities at the mouth of Shell Creek near Yost Park. Although Sound Transit is not pursuing this option as part of its near shore mitigation for the Seattle-Everett Commuter Rail Project, this option received positive scores on all physical and biological evaluation criteria. This beach rehabilitation option could also expand the high tide beach area available for backshore vegetation enhancement and public use. Site was identified as second best opportunity for beach restoration potential by Sound Transit. Concerns expressed about the need for sustained effort to maintain beach nourishment projects, (this reduces feasibility). Few examples of beach nourishment have been attempted in the area and pilot projects are needed to evaluate their utility. A potential source of sediments for this or other beach nourishment projects is dredged materials from the Duwamish or Snohomish Rivers and delta. Dredging planned in these areas by the U.S. Army Corps of Engineers.
	LOCATION: Nearshore Area – Sub-Reach 9.08-9.09: Shell Creek
	PARTNERS: City of Edmonds
	SOURCE: Nearshore / Estuary Chinook Population – Tier I – Initial Habitat Project List
Shell Creek Culvert Replacement	DESCRIPTION: Replace the existing culvert where Shell Creek crosses the railroad with a trestle to restore connectivity and improve sediment transport. Good quality wetland habitat exists upstream of the culvert that could be more accessible if culvert replaced.
	LOCATION: Nearshore Area – Sub-Reach 9.08-9.09: Shell Creek
	PARTNERS: City of Edmonds
	SOURCE: Nearshore / Estuary Chinook Population – Tier I – Initial Habitat Project List
Brackett's Landing Park Vegetation Enhancement	DESCRIPTION: Riparian vegetation enhancement at Brackett's landing including addition of low-growing trees. There is an invasive species problem just to the north of the site. Further enhance the marine riparian vegetation by adding native plants to existing backshore areas and removing non-native invasive plants where appropriate and compatible with existing park uses. One of Snohomish County's largest kelp beds extends north from Edmonds Underwater Park. Surf smelt and sand lance spawning has been documented along Olympic Beach and Brackett's Landing. The southwestern two-thirds of Olympic Beach is modified by a sea wall. The City of Edmonds owns all but 100 feet of the tidelands in this shore unit and about two-thirds of the adjoining upland property. The City of Edmonds has established small parks with public shoreline access on both sides of the ferry terminal. These park improvements include some native marine riparian vegetation.
	LOCATION: Nearshore Area – Sub-Reach 9.08-9.09: Shell Creek
	PARTNERS: City of Edmonds
	SOURCE: Nearshore / Estuary Chinook Population – Tier I – Initial Habitat Project List
Willow Creek Daylighting	DESCRIPTION: Proposed mitigation project for nearby "Edmonds Crossing" development (including new ferry terminal). Daylighting creek through existing fuel pier (using box culverts) will improve connectivity with the Willow Creek Marsh, one of the largest remaining marsh areas in the WRIA 8 near shore. Possibility of also restoring vegetation at the outfall of Willow Creek as well.
	LOCATION: Nearshore Area – Sub-Reach 9.15: Willow Creek
	PARTNERS: City of Edmonds
	SOURCE: Nearshore / Estuary Chinook Population – Tier I – Initial Habitat Project List
Willow Creek Pier Removal	DESCRIPTION: Demolition of existing pier as part of mitigation for new ferry terminal. Potential concern over contaminated materials at the site
	LOCATION: Nearshore Area – Sub-Reach 9.15: Willow Creek
	PARTNERS: City of Edmonds
	SOURCE: Nearshore / Estuary Chinook Population – Tier I – Initial Habitat Project List
Woodway Tidal Lagoon North	DESCRIPTION: Potential culvert improvement project at an inter-tidal lagoon and mud flat where railroad was built offshore south of willow creek. Potential fresh water seepage into lagoon could make for good shallow water habitat. Site should be investigated further, as little is currently known. Sound Transit is scheduled to conduct track improvements (widening) at the site soon, and culvert improvements or other accommodations could potentially be designed into the project to improve connectivity of lagoon to near shore. Potential Sound Transit mitigation site.
	LOCATION: Nearshore Area – Reach 10A: Edwards Point to Meadow Point
	PARTNERS: City of Woodway, Sound Transit
	SOURCE: Nearshore / Estuary Chinook Population – Tier I – Initial Habitat Project List
Deer Creek Restoration	DESCRIPTION: Enhance the connectivity of Deer Creek and the associated estuarine wetland with

or Culvert Replacement	the near shore by replacing the two concrete culverts with an oversized culvert or a trestle bridge. Sound Transit will be conducting some mitigation at this site for proposed track improvements including either vegetation enhancement OR the replacement of the existing culvert with a trestle. This option was considered by Sound Transit for its mitigation plan, but was rejected for cost and logistical reasons.
	LOCATION: Nearshore Area – Reach 10A: Edwards Point to Meadow Point
	PARTNERS: City of Woodway, Sound Transit
	SOURCE: Nearshore / Estuary Chinook Population – Tier I – Initial Habitat Project List
Point Wells Complete Site Restoration	DESCRIPTION: Restore the entire Point Wells site by completely removing the sea wall, riprap dike, and fill. Regrade the site and reconnect local freshwater sources to re-create a tidal lagoon system with an opening at the north end of the point, which was probably the original mouth of the tidal lagoon system. Reestablish native riparian and backshore vegetation. Point Wells is within Snohomish County jurisdiction and the current land use designation is “Rural Use.” The future land use designation is “Urban Industrial.” The site is proposed for annexation by the City of Shoreline or the City of Woodway. The City of Shoreline has shown interest in the site for commercial development. The northern part of this site is the preferred alternative for siting the Shoreline commuter rail station.
	LOCATION: Nearshore Area – Reach 10A: Edwards Point to Meadow Point
	PARTNERS: Snohomish County, City of Shoreline, City of Woodway
	SOURCE: Nearshore / Estuary Chinook Population – Tier I – Initial Habitat Project List
South Point Wells Habitat Restoration	DESCRIPTION: Enhance the south shoreline by removing riprap dike, eliminating invasive plants, and reestablishing native riparian and backshore vegetation. The south shoreline is approximately 800 feet long, has sandy substrate, supports some beach grass and other herbaceous vegetation, and includes a fair amount of large woody debris. Point Wells is within Snohomish County jurisdiction and the current land use designation is “Rural Use.” The future land use designation is “Urban Industrial.” The site is proposed for annexation by the City of Shoreline or the City of Woodway. The City of Shoreline has shown interest in the site for commercial development. The northern part of this site is the preferred alternative for siting the Shoreline commuter rail station. The south shoreline, with its proximity to nearby residential areas, has potential value for public access.
	LOCATION: Nearshore Area – Reach 10A: Edwards Point to Meadow Point
	PARTNERS: Snohomish County, City of Shoreline, City of Woodway
	SOURCE: Nearshore / Estuary Chinook Population – Tier I – Initial Habitat Project List
Deer Creek Habitat Acquisition	DESCRIPTION: Preserve the existing riparian vegetation, stream outfalls, and unmodified shoreline along the southern portion of the Deer Creek outfall area. This site includes two shore units north of Point Wells. It is within the City of Woodway. The southern portion of this site is a high quality remnant riparian area with several small freshwater outfalls that flow across the unmodified beach face. A wide eelgrass bed extends north from this beach and covers much of the adjacent low tide terrace. Forest cover in the Deer Creek drainage basin is relatively intact and much of the riparian area along the stream is owned by the Olympic View Water District. Sound Transit is planning to reestablish the second railroad track along this segment, up to Edmonds.
	LOCATION: Nearshore Area – Reach 10A: Edwards Point to Meadow Point
	PARTNERS: City of Woodway, Olympic View Water District, Sound Transit
	SOURCE: Nearshore / Estuary Chinook Population – Tier I – Initial Habitat Project List
Point Wells North Habitat Acquisition	DESCRIPTION: Acquisition and protection of a very small (~ one acre) remnant piece of marine riparian habitat exists on the north side of Point Wells. Despite the proximity to the Point Wells site, it would be a valuable piece to protect. Approx. 850 ft. of shoreline. Landowner unknown.
	LOCATION: Nearshore Area – Reach 10A: Edwards Point to Meadow Point
	PARTNERS: Snohomish County
	SOURCE: Nearshore / Estuary Chinook Population – Tier I – Initial Habitat Project List
North Creek Restoration Projects	
Protect Forested Wetlands North of 240th	DESCRIPTION: Protect forested, undeveloped property North of 240 th (County Line) through conservation easement or acquisition. This reach has the highest spawning area on North Creek.
	LOCATION: North Creek – Reach 3 – North of 240 th to 228 th
	PARTNERS: Snohomish County, City of Bothell
	SOURCE: North Lake Washington Basin Salmon Conservation Plan
Floodplain Restoration North of 228th	DESCRIPTION: Acquire property North of 228 th . Return North Creek to natural channel by removing berm that has redirected the creek. Restore riparian vegetation and side channels and add

	large woody debris. Increase flood storage and flood refuge habitat. LOCATION: North Creek Reach 4 – North of 228 th to 208 th PARTNERS: Snohomish County SOURCE: North Lake Washington Basin Salmon Conservation Plan
Enhance Mouth of Palm Creek	DESCRIPTION: Enhance mouth and lower 100 yards of Palm Creek as cold-water refuge for juvenile Chinook. Barriers to Coho identified by Adopt-a-Stream Foundation. LOCATION: North Creek Reach 4 – North of 228 th to 208 th PARTNERS: Snohomish County, Adopt-a-Stream SOURCE: North Lake Washington Basin Salmon Conservation Plan
Enhance Creek in Thrashers Corner Area	DESCRIPTION: Enhance incised stream channel within Thrashers Corner area, restore riparian vegetation, plant conifers and add large woody debris. LOCATION: North Creek Reach 4 – North of 228 th to 208 th PARTNERS: Snohomish County SOURCE: North Lake Washington Basin Salmon Conservation Plan
Expand Twin Creeks Project	DESCRIPTION: Expand existing restoration project upstream and downstream of existing area just upstream of 208 th . Restore riparian vegetation, add large woody debris, enhance side channel habitat. LOCATION: North Creek Reach 5 – North of 208 th to 196 th PARTNERS: Snohomish County SOURCE: North Lake Washington Basin Salmon Conservation Plan
Continue North Creek School Project (Map 12 id #33)	DESCRIPTION: Work with school to do additional riparian restoration, add large woody debris, and side channel enhancements on their property. LOCATION: North Creek Reach 5 – North of 208 th to 196 th PARTNERS: Snohomish County SOURCE: North Lake Washington Basin Salmon Conservation Plan
Riparian Restoration and Stream Enhancements	DESCRIPTION: Work with landowners in Reach 5 to restore riparian vegetation and do stream enhancements. Adopt-a-Stream's program could be expanded to Bothell portion of creek. LOCATION: North Creek Reach 5 – North of 208 th to 196 th PARTNERS: Snohomish County, City of Bothell, Adopt-a-Stream SOURCE: North Lake Washington Basin Salmon Conservation Plan
Little Bear Creek Restoration Projects	
Add Large Woody Debris in Reach 4	DESCRIPTION: Add large woody debris in this privately owned reach. Reach is mostly glide habitat; culvert at 205 th could be an obstruction. LOCATION: Little Bear Creek – Reach 4 – Confluence Rowlands Creek to Industrial Reach PARTNERS: Snohomish County SOURCE: North Lake Washington Basin Salmon Conservation Plan
Little Bear Creek Restoration at Alpine Rockeries (Map 12 id #71)	DESCRIPTION: Snohomish County project to work with Alpine Rockeries to restore riparian vegetation, add large woody debris and potentially reconfigure stream channel on 800 feet of Little Bear Creek. LOCATION: Little Bear Creek – Reach 5 – Industrial Reach to Howell Creek PARTNERS: Snohomish County SOURCE: North Lake Washington Basin Salmon Conservation Plan
Swamp Creek Restoration Projects	
Swamp Creek P1 Fish Passage Project Benefitting All Species (Including Chinook)	DESCRIPTION: Replace culverts. LOCATION: Culverts under I-405 and I-5, Golde Creek and Little Swamp Creek PARTNERS: Snohomish County, Adopt-a-stream, Department of Fish and Wildlife SOURCE: North Lake Washington Basin Salmon Conservation Plan
Swamp Creek P3 Upland Forest Cover Protection	DESCRIPTION: Acquire properties and wetlands in the Swamp Creek Corridor for protection, including those with high quality habitat or within the floodplain. LOCATION: (1) Lake Stickney wetlands and uplands; (2) Locust Way south of 234 th Place SW; (3) Scriber Creek wetlands north of Larch Way; (4) acquire other areas identified in Snohomish County's Endangered Species Act Priority Land Acquisition Program PARTNERS: (unspecified) SOURCE: North Lake Washington Basin Salmon Conservation Plan

Table 6: Restoration Projects for Future Consideration (cont.)

WRIA 7- Snohomish Basin	
Nearshore Restoration Projects	
Railroad Shoreline Improvements	DESCRIPTION: The railroad that runs along the shoreline between Everett and Mukilteo significantly degrades the near shore edge. Opportunities to mitigate impacts include placing artificial reefs, lowering slope along railroad grade, and revegetation on the waterward side of the tracks where feasible.
	LOCATION: Nearshore Area between Everett and Mukilteo
	PARTNERS: Burlington Northern/Santa Fe Railroad and U.S. Army Corps of Engineers
	SOURCE: Snohomish River Basin Salmon Conservation Plan, Appendix J – Project Ideas & Opportunities List
Merrill and Ring Creek Bridges	DESCRIPTION: Install bridges at the mouths of coastal drainages along the railroad to allow more sediment through. The intent of these projects is to allow sediment to pass more freely to the beach. Part of Sound Transit's mitigation actions.
	LOCATION: Nearshore Area – Everett
	PARTNERS: Sound Transit with Burlington Northern/Santa
	SOURCE: Snohomish River Basin Salmon Conservation Plan, Appendix J – Project Ideas & Opportunities List
Sand Berm at Jetty Island (South) (Map 12 id #51)	DESCRIPTION: Expand existing beach south along exposed rock jetty at the southern end of the island and/or create an additional embayment using dredge spoils to increase habitat function for salmon, forage fish, and shorebirds.
	LOCATION: Nearshore Area – Jetty Island Area
	PARTNERS: Port of Everett
	SOURCE: Snohomish River Basin Salmon Conservation Plan, Appendix J – Project Ideas & Opportunities List
Sand Berm at Jetty Island (North) (Map 12 id #51)	DESCRIPTION: Continue to support this existing project that has created a protected embayment with high ecological values on the bayside of Jetty Island. Although not self-sustaining, it has proven to be a benefit to salmon and an economical dredge disposal option.
	LOCATION: Nearshore Area – Jetty Island Area
	PARTNERS: Port of Everett
	SOURCE: Snohomish River Basin Salmon Conservation Plan, Pentec Environmental Nearshore Habitat Restoration 2003, Appendix J – Project Ideas & Opportunities List
Maulsby Swamp/Mud Flats Restoration and Reconnection	DESCRIPTION: Reconnect a large wetland that has been isolated by West Marine View Drive. Eliminate log raft storage and restore shoreline and riparian function surrounding large central mudflat. Final disposition of mudflat will be determined in the sub-area management plan. The proportion of the site that will be restored or used for Port expansion is unknown, making this a controversial site.
	LOCATION: Nearshore Area – Port of Everett
	PARTNERS: Port of Everett, City of Everett, several private landowners
	SOURCE: Snohomish River Basin Salmon Conservation Plan, Appendix J – Project Ideas & Opportunities List
West Priest Point Bulkhead Restoration	DESCRIPTION: Replace bulkheads on private property with a softer alternative that is more ecologically friendly. Use as a model for other private property sites. Bulkheading has caused significant beach erosion and degradation in beach communities along the shoreline of the Tulalip reservation and Hat Island.
	LOCATION: Nearshore Area – Priest Point Area
	PARTNERS: Snohomish County, The Tulalip Tribes, private partnerships
	SOURCE: Snohomish River Basin Salmon Conservation Plan, Appendix J – Project Ideas & Opportunities List
Priest Point Tidal Lagoon	DESCRIPTION: Although challenging due to the abundance of homes around the perimeter of the site, this project presents a unique opportunity with high ecological benefits. It would involve acquisition and restoration of the former lagoon, which is now an isolated wetland. A cross-dike may be needed to protect houses. A self-regulating tide-gate would be a much cheaper, but probably less effective option.

	LOCATION: Nearshore Area – Priest Point Area
	PARTNERS: Snohomish County, The Tulalip Tribes
	SOURCE: Snohomish River Basin Salmon Conservation Plan, Appendix J – Project Ideas & Opportunities List
Tulalip Bay Nearshore Restoration	DESCRIPTION: This project focuses on eelgrass and forage fish spawning around the perimeter of the bay, starting with tribal property. Conduct public outreach to private landowners interested in completing similar projects.
	LOCATION: Nearshore Area – Tulalip Bay Area
	PARTNERS: The Tulalip Tribes with U.S. Army Corps of Engineers
	SOURCE: Snohomish River Basin Salmon Conservation Plan, Appendix J – Project Ideas & Opportunities List
Beach Nourishment #1	DESCRIPTION: from the Tank Farm to the mouth of Edgewater Creek. Port Berth expansion preferred mitigation site.
	LOCATION: Nearshore Area – Everett
	PARTNERS: State, Port of Everett
	SOURCE: Snohomish River Basin Salmon Conservation Plan, Appendix J – Project Ideas & Opportunities List
Beach Nourishment #2	DESCRIPTION: between Narbeck and Merrill and Ring Creeks. Being considered by Port as a potential mitigation site for Port Berth expansion.
	LOCATION: Nearshore Area – Everett
	PARTNERS: State, Port of Everett
	SOURCE: Snohomish River Basin Salmon Conservation Plan, Appendix J – Project Ideas & Opportunities List
Howarth and Forest Park Beaches	DESCRIPTION: Enhance connectivity of Pigeon Creek 1 & 2 by replacing existing culverts; reestablish a stable high tide beach and backshore area. 4,541 ft. upstream of barriers.
	LOCATION: Nearshore Area – Everett
	PARTNERS: City of Everett, Port
	SOURCE: Snohomish River Basin Salmon Conservation Plan, Appendix J – Project Ideas & Opportunities List
Daylight Japanese Gulch	DESCRIPTION: Benefit for Coho and cutthroat, but not Chinook.
	LOCATION: Nearshore Area – Everett
	PARTNERS: City of Everett
	SOURCE: Snohomish River Basin Salmon Conservation Plan, Appendix J – Project Ideas & Opportunities List
Edgewater Creek Outfall	DESCRIPTION: Enhance the connectivity of the creek with the nearshore. 1,094 ft. upstream of culvert.
	LOCATION: Nearshore Area – Everett
	PARTNERS: WSDOT
	SOURCE: Snohomish River Basin Salmon Conservation Plan, Appendix J – Project Ideas & Opportunities List
Continue protecting eelgrass beds	DESCRIPTION: The eelgrass beds at the mouth of the Snohomish River delta are among the largest in central Puget Sound. Some of this area lies within Everett's shoreline jurisdiction.
	LOCATION: Nearshore Area – Snohomish River delta
	PARTNERS: Washington State Department of Natural Resources, City of Everett
	SOURCE: Snohomish River Basin Salmon Conservation Plan
Develop strategy to protect and restore shoreline at Potlatch	DESCRIPTION: This area has high potential for protection and restoration. A program is needed to protect and improve edge conditions on many small beachfront lots. Some new development is expected, but away from the bluffs. In the long-term, bulkheading needs to be addressed.
	LOCATION: Nearshore Area – Snohomish River
	PARTNERS: The Tulalip Tribes, Snohomish County
	SOURCE: Snohomish River Basin Salmon Conservation Plan
Develop strategy to protect and restore shoreline at Tulalip Shores	DESCRIPTION: This area has high potential for protection and restoration. A program is needed to protect and improve edge conditions on many small beachfront lots. For future development, require setbacks and vegetation management along bluffs. Tribal shoreline regulations apply here.
	LOCATION: Nearshore Area – Snohomish River
	PARTNERS: The Tulalip Tribes, Snohomish County

	SOURCE: Snohomish River Basin Salmon Conservation Plan
Develop protection strategy for the Hat Island shoreline	DESCRIPTION: This has a high potential for protection. A program is needed to protect and improve edge conditions on many small beachfront lots. The Shoreline Master Program is important here. Bulkheading could increase.
	LOCATION: Nearshore Area – Snohomish River
	PARTNERS: Snohomish County, residents of Hat Island
	SOURCE: Snohomish River Basin Salmon Conservation Plan
Develop habitat restoration strategy for urban shorelines in Everett and Mukilteo.	DESCRIPTION: Although habitat gains in the near shore are limited by shoreline development, the location of these urban areas increases their importance for maintaining and enhancing shorelines where possible.
	LOCATION: Nearshore Area – City of Everett, City of Mukilteo
	PARTNERS: City of Everett, City of Mukilteo, Port of Everett
	SOURCE: Snohomish River Basin Salmon Conservation Plan
Develop strategy to reduce septic issues along shoreline communities	DESCRIPTION: Reduce contamination from septic systems.
	LOCATION: Nearshore Area – Snohomish River
	PARTNERS: Snohomish County, City of Everett, The Tulalip Tribes
	SOURCE: Snohomish River Basin Salmon Conservation Plan
Continue and expand coordinated mitigation/restoration strategy	DESCRIPTION: Combining funds from the Port expansion and other activities with restoration sources will help complete large tidal marsh reconnection projects at lower cost.
	LOCATION: Nearshore Area – Snohomish River
	PARTNERS: Snohomish County, City of Everett, Port of Everett, The Tulalip Tribes, Sound Transit, others
	SOURCE: Snohomish River Basin Salmon Conservation Plan
Coordinate with Sound Transit to identify mitigation opportunities that meet basin salmon recovery needs	DESCRIPTION: Sound Transit's mitigation actions for bridging small creeks are listed in Appendix I.
	LOCATION: Nearshore Area – Snohomish River
	PARTNERS: Sound Transit, Snohomish County
	SOURCE: Snohomish River Basin Salmon Conservation Plan
Continue to support the Marine Resources Committee	DESCRIPTION: This multi-interest committee addresses marine issues along the Snohomish County shoreline. Marine Resources Committee re-authorization must occur by September 2004.
	LOCATION: Nearshore Area – Snohomish River
	PARTNERS: Snohomish County
	SOURCE: Snohomish River Basin Salmon Conservation Plan
Conduct bioengineering demonstration project	DESCRIPTION: Show alternatives to riprap that can disperse wave energy.
	LOCATION: Nearshore Area – Snohomish River
	PARTNERS: Snohomish County, City of Everett, Port of Everett, The Tulalip Tribes, Sound Transit
	SOURCE: Snohomish River Basin Salmon Conservation Plan
Develop incentives for bulkheading alternatives	DESCRIPTION: Encourage alternative solutions to bulkheads.
	LOCATION: Nearshore Area – Snohomish River
	PARTNERS: Snohomish County, The Tulalip Tribes, City of Everett, City of Mukilteo, City of Marysville
	SOURCE: Snohomish River Basin Salmon Conservation Plan
Provide technical assistance and stewardship information to homeowners (see discussion of Non-regulatory programs)	DESCRIPTION: Topics should include alternatives to bulkheading and guidance for marine shore stewardship.
	LOCATION: Nearshore Area – Snohomish River
	PARTNERS: Snohomish County, The Tulalip Tribes, City of Everett
	SOURCE: Snohomish River Basin Salmon Conservation Plan
Strengthen shoreline regulations to encourage or require softer forms of shoreline protection	DESCRIPTION: Tulalip Tribes has proposed new regulations.
	LOCATION: Nearshore Area – Snohomish River
	PARTNERS: Snohomish County, City of Everett, The Tulalip Tribes
	SOURCE: Snohomish River Basin Salmon Conservation Plan
Critical areas ordinance updates (adopted 2007)	DESCRIPTION: Better address needs of salmon habitat protection.
	LOCATION: Nearshore Area – Snohomish River

	PARTNERS: Snohomish County, City of Everett
	SOURCE: Snohomish River Basin Salmon Conservation Plan
Develop long-term strategy for sediment re-nourishment	DESCRIPTION: There is a mitigation proposal to bring in material for beach restoration east of the tank farm near Mukilteo. This is expected to be a good pilot project to measure potential benefits of such actions, but would not be self-sustainable. The long-term effort should include helping reduce the impact of the railroad and the sediment removal conducted by the railroad for maintenance.
	LOCATION: Nearshore Area – Snohomish River
	PARTNERS: Burlington Northern/Santa Fe Railroad, State, others
	SOURCE: Snohomish River Basin Salmon Conservation Plan
Estuary Restoration Projects	
Everett Union Slough (Map 12 id# 1)	DESCRIPTION: Construction is already underway on this 95-acre project site on Smith Island along Union Slough and adjacent to the treatment plant. It provides an excellent example of how mitigation and restoration dollars can be pooled to create an improved project with high salmon benefits. (Update: Project has been completed)
	LOCATION: Snohomish Estuary
	PARTNERS: City of Everett and U.S. Army Corps of Engineers
	SOURCE: Snohomish River Basin Salmon Conservation Plan, Appendix J – Project Ideas & Opportunities List
Spencer Island	DESCRIPTION: This 200-acre property on South Spencer Island is in public ownership. It is managed as a non-tidal wetland, park, and duck hunting reserve. The hog-fuel dike is failing and would be cost prohibitive to repair. Breaching the dike to provide full access and tidal exchange would be the most cost effective restoration project in the estuary, and would not preclude other park uses.
	LOCATION: Snohomish Estuary
	PARTNERS: Washington State Department of Fish and Wildlife, Snohomish County, Ducks Unlimited
	SOURCE: Snohomish River Basin Salmon Conservation Plan , Appendix J – Project Ideas & Opportunities List, SEWIP/Haas and Collins, 2001
Qwuloolt Restoration Project	DESCRIPTION: Approximately 324 acres at the mouth of Allen Creek along Ebey Slough have been acquired for restoration. Planning and design work is underway. It is located within the highly productive emergent/forested transition zone and the length of cross-dike needed is short relative to the number of acres that will be restored.
	LOCATION: Snohomish Estuary
	PARTNERS: The Tulalip Tribes with numerous partners
	SOURCE: Snohomish River Basin Salmon Conservation Plan , Appendix J – Project Ideas & Opportunities List, SEWIP/Haas and Collins, 2001
Smith Island Rhodes (Map 12 id# 1)	DESCRIPTION: Snohomish County acquired 354 acres east of Interstate-5 along Union Slough in the heart of the fresh/saltwater mixing zone. The site contains several large isolated channels, enhancing its restoration value. Adjacent properties are available for acquisition. Up to 390 acres could be restored and connected to Everett's Union Slough site, making it one of the largest estuary restoration sites in the state.
	LOCATION: Snohomish Estuary
	PARTNERS: Snohomish County, City of Everett, Williams Pipeline, Inc.
	SOURCE: Snohomish River Basin Salmon Conservation Plan , Appendix J – Project Ideas & Opportunities List, SEWIP/Haas and Collins, 2001
Biringer Farms	DESCRIPTION: The Port of Everett acquired this 320-acre property for mitigation and restoration. It is in the very productive fresh and saltwater mixing zone and has similar function and values to the Smith Island Rhodes site. Restoration will require a short cross dike.
	LOCATION: Snohomish Estuary
	PARTNERS: Port of Everett
	SOURCE: Snohomish River Basin Salmon Conservation Plan , Appendix J – Project Ideas & Opportunities List, SEWIP/Haas and Collins, 2001
North Tip of Ebey Island	DESCRIPTION: This restoration site has the potential to restore as many as 400 acres to tidal marsh. Snohomish County owns several hundred acres on the tip of the island peninsula. Additional acquisitions would improve the cost/benefit ratio. This project is supported by the Diking District commissioners as farming in this area is marginal, and it would reduce maintenance costs.
	LOCATION: Snohomish Estuary

	PARTNERS: Snohomish County
	SOURCE: Snohomish River Basin Salmon Conservation Plan , Appendix J – Project Ideas & Opportunities List, SEWIP/Haas and Collins, 2001
Drainage District 6	DESCRIPTION: Approximately 235 acres along Ebey Slough in the forested riverine tidal zone were acquired for restoration and a restoration plan was produced. Restoration should proceed pending funding and plan to continue farming behind the dike.
	LOCATION: Snohomish Estuary
	PARTNERS: Snohomish County, city of Everett
	SOURCE: Snohomish River Basin Salmon Conservation Plan , Appendix J – Project Ideas & Opportunities List, SEWIP/Haas and Collins, 2001
Port Union Slough site expansion	DESCRIPTION: The Port of Everett is planning a six-acre expansion of the Union Slough mitigation site. Although it is small, it is one of the closest sites to the delta front that has been proposed.
	LOCATION: Snohomish Estuary
	PARTNERS: Port of Everett
	SOURCE: Snohomish River Basin Salmon Conservation Plan , Appendix J – Project Ideas & Opportunities List, Staff
Edge and off-channel habitat restoration along the mainstem and in the emergent marsh	DESCRIPTION: Restoration along the mainstem channel and in the emergent marsh is costly because it is constrained by industrial development, but it may be critical to recovery. Out-migrants in the mainstem may not always find high quality habitat on the other side of the estuary due to fragmentation. Several projects have been identified in the project idealist. Some progress should be made in the next ten years even if the costs are high relative to other projects.
	LOCATION: Snohomish Estuary
	PARTNERS: City of Everett and Snohomish County
	SOURCE: Snohomish River Basin Salmon Conservation Plan
North Ebey Island Enhancement	DESCRIPTION: This project involves planting native vegetation and incorporating large woody debris to improve the quality and diversity of habitat on County-owned land that breached naturally in the 1960s. Plantings would involve spruce and other native species along the relict dike system to add complexity and act as a seed source. This project is already underway. If successful, it could be expanded. Additional enhancement proposed to provide additional connections through remnant dike.
	LOCATION: Snohomish Estuary
	PARTNERS: Snohomish County
	SOURCE: Snohomish River Basin Salmon Conservation Plan, Appendix J – Project Ideas & Opportunities List, Staff
Southwest tip South Ebey Island	DESCRIPTION: One of the highest properties in the estuary. Bank armoring prevents tidal inundation and fish access into a wetland. Excavating a channel between the river and the wetland would create off-channel refuge and rearing habitat. No crossdike needed. One of few opportunities along mainstem.
	LOCATION: Snohomish Estuary
	PARTNERS: Private
	SOURCE: Snohomish River Basin Salmon Conservation Plan, Appendix J – Project Ideas & Opportunities List, SEWIP/Haas and Collins, 2001
Simpson Lee	DESCRIPTION: Former mill site. Highly affected wetland along a small creek. One of few opportunities to create off-channel habitat along the left bank of the mainstem.
	LOCATION: Snohomish Estuary
	PARTNERS: City of Everett
	SOURCE: Snohomish River Basin Salmon Conservation Plan, Appendix J – Project Ideas & Opportunities List, SEWIP/Haas and Collins, 2001
Smith Island delta front	DESCRIPTION: In the EEM zone. Largest undeveloped land block and most viable restoration opportunity in the lower estuary downstream of I-5.
	LOCATION: Snohomish Estuary
	PARTNERS: Private
	SOURCE: Snohomish River Basin Salmon Conservation Plan, Appendix J – Project Ideas & Opportunities List, SEWIP/Haas and Collins, 2001
SR-529 Spencer	DESCRIPTION: Small site located between highways and Steamboat and Union sloughs. A potential expansion of mitigation site to the south.
	LOCATION: Snohomish Estuary

	PARTNERS: Port of Everett
	SOURCE: Snohomish River Basin Salmon Conservation Plan, Appendix J – Project Ideas & Opportunities List, SEWIP/Haas and Collins, 2001
South Ebey Island WDFW	DESCRIPTION: Potential site for tidal marsh restoration. Large forested site on S. Ebey Island along Ebey Slough.
	LOCATION: Snohomish Estuary
	PARTNERS: WDFW
	SOURCE: Snohomish River Basin Salmon Conservation Plan, Appendix J – Project Ideas & Opportunities List, SEWIP/Haas and Collins, 2001
Swan Slough	DESCRIPTION: Slough channel along right bank of Ebey Slough and mainstem at upstream end of estuary. Currently blocked by a tide-gate and pumpstation.
	LOCATION: Snohomish Estuary
	PARTNERS: Private / Drainage District 13
	SOURCE: Snohomish River Basin Salmon Conservation Plan, Appendix J – Project Ideas & Opportunities List, SEWIP/Haas and Collins, 2001
Ferry Baker Island	DESCRIPTION: Two small islands across from Langus Park. Complexity in a reach that has been highly modified. Opportunity to enhance by removing dredge spoils.
	LOCATION: Snohomish Estuary
	PARTNERS: City of Everett
	SOURCE: Snohomish River Basin Salmon Conservation Plan, Appendix J – Project Ideas & Opportunities List, SEWIP/Haas and Collins, 2001
Deadwater Slough	DESCRIPTION: Tide-gate and pump station block fish access to largest blind tidal slough on Ebey Island. Provide passage and acquire adjacent properties between Deadwater and Ebey sloughs. Xdike= 14,321ft.
	LOCATION: Snohomish Estuary
	PARTNERS: Private
	SOURCE: Snohomish River Basin Salmon Conservation Plan, Appendix J – Project Ideas & Opportunities List, SEWIP/Haas and Collins, 2001
Sunnyside North	DESCRIPTION: In the FRT zone north of Lake Stevens wastewater facility. Several small streams and cutoff sloughs. Xdike= 6,500 ft.
	LOCATION: Snohomish Estuary
	PARTNERS: Private
	SOURCE: Snohomish River Basin Salmon Conservation Plan, Appendix J – Project Ideas & Opportunities List, SEWIP/Haas and Collins, 2001
Sunnyside South – (Nyman Farm)	DESCRIPTION: In the FRT zone south of the Lake Stevens wastewater facility. Current flooding problems for landowners from development upstream. Pipeline may make full restoration difficult. Xdike= 3,800 ft.
	LOCATION: Snohomish Estuary
	PARTNERS: Private
	SOURCE: Snohomish River Basin Salmon Conservation Plan, Appendix J – Project Ideas & Opportunities List, SEWIP/Haas and Collins, 2001
South Ebey Island NW corner	DESCRIPTION: Potential site to restore tidal marsh in the FRT zone along the mainstem west of Home Acres Rd. Xdike= 11,900 ft.
	LOCATION: Snohomish Estuary
	PARTNERS: Private
	SOURCE: Snohomish River Basin Salmon Conservation Plan, Appendix J – Project Ideas & Opportunities List, SEWIP/Haas and Collins, 2001
Langus Park #50	DESCRIPTION: Connect isolated slough adjacent to park. Also opportunities to improve complexity along edge of mainstem. Xdike= 6,562 ft.
	LOCATION: Snohomish Estuary
	PARTNERS: City of Everett
	SOURCE: Snohomish River Basin Salmon Conservation Plan, Appendix J – Project Ideas & Opportunities List, SEWIP/Haas and Collins, 2001
South Ebey Island NE corner	DESCRIPTION: Potential site to restore tidal marsh in the FRT zone. Located between east of Deadwater Slough and south of SR-2. In FRT zone. Tie in as part of larger project with properties to the west and south. Xdike= 9,504 ft. (if not tied in with neighboring projects.)
	LOCATION: Snohomish Estuary

	PARTNERS: Private
	SOURCE: Snohomish River Basin Salmon Conservation Plan, Appendix J – Project Ideas & Opportunities List, SEWIP/Haas and Collins, 2001
N. Smith Island, Union Slough	DESCRIPTION: One of few undeveloped sites in the downstream of I-5 in the EFT zone. Potential for tidal marsh restoration. Located just downstream of Smith Slough cutoff and Buse Mill. Xdike= 10,860 ft.
	LOCATION: Snohomish Estuary
	PARTNERS: Private
	SOURCE: Snohomish River Basin Salmon Conservation Plan, Appendix J – Project Ideas & Opportunities List, SEWIP/Haas and Collins, 2001
Smith Slough, Smith Island	DESCRIPTION: Reconnect cutoff distributary slough that once connected the mainstem and Steamboat Slough. In EFT zone.
	LOCATION: Snohomish Estuary
	PARTNERS: Private
	SOURCE: Snohomish River Basin Salmon Conservation Plan, Appendix J – Project Ideas & Opportunities List, SEWIP/Haas and Collins, 2001
Reduce log rafting	DESCRIPTION: Work with log towing companies, Kimberly-Clark, and Washington State Department of Natural Resources to reduce or buy out log rafting rights. Start in the most critical areas: shallow edges that go dry with tidal influence and mouths of large blind tidal sloughs (such as the mouth of Quilceda Creek, or the estuary in front of Smith Island).
	LOCATION: Snohomish Estuary
	PARTNERS: unspecified
	SOURCE: Snohomish River Basin Salmon Conservation Plan
Evaluate tide-gate blockages and identify solutions	DESCRIPTION: Install upgrades to improve fish passage and prevent stranding, particularly on streams. Pilot projects have been tested in the Skagit River.
	LOCATION: Snohomish Estuary
	PARTNERS: Diking Districts, others
	SOURCE: Snohomish River Basin Salmon Conservation Plan
Identify solutions that benefit agriculture and salmon	DESCRIPTION: Some areas of the estuary may be difficult to farm due to dike maintenance difficulties. In agricultural areas, work cooperatively with farmers to find solutions for the estuary and lower Snohomish River that identifies where best to protect agriculture and where to improve fish habitat. A programmatic approach is needed to minimize the cross-dikes.
	LOCATION: Snohomish Estuary
	PARTNERS: Snohomish County, Snohomish Conservation District, Diking Districts, farm organizations, farmers
	SOURCE: Snohomish River Basin Salmon Conservation Plan
Require setbacks (e.g., 25 feet) or other improvements when dikes are modified	DESCRIPTION: Regulatory revisions.
	LOCATION: Snohomish Estuary
	PARTNERS: Snohomish County, City of Everett
	SOURCE: Snohomish River Basin Salmon Conservation Plan
Develop a coordinated mitigation/restoration strategy for the estuary	DESCRIPTION: Refine list of mitigation/restoration sites and build on the strategies identified by SEWIP Salmon (Overlay, 2001 and Haas, 2001). Combine mitigation funding and restoration funding sources to complete larger tidal marsh reconnection projects at lower cost. Explore mitigation banking as a means to accomplish this project.
	LOCATION: Snohomish Estuary
	PARTNERS: City of Everett, Port of Everett, Snohomish County, The Tulalip Tribes
	SOURCE: Snohomish River Basin Salmon Conservation Plan
Encourage all those who benefit from dikes to pay for maintenance and fish friendly modifications	DESCRIPTION: unspecified
	LOCATION: Snohomish Estuary
	PARTNERS: Various utilities and transportation agencies
	SOURCE: Snohomish River Basin Salmon Conservation Plan
Sunnyside Hill	DESCRIPTION: Homeowners and farmers experience increased flooding from rapid development and the existing pump. Snohomish County is currently investigating solutions.
	LOCATION: Snohomish Estuary
	PARTNERS: Snohomish County
	SOURCE: Snohomish River Basin Salmon Conservation Plan

Encourage passive recreation in the estuary	DESCRIPTION: Support efforts to encourage passive use (birding, non-motorized boating) to help build understanding and support for estuary restoration.
	LOCATION: Snohomish Estuary
	PARTNERS: Snohomish County, City of Everett, The Tulalip Tribes, Port of Everett
	SOURCE: Snohomish River Basin Salmon Conservation Plan
Work with WSDOT to coordinate I-5 and right-of-way expansion mitigation needs with basin restoration priorities	DESCRIPTION: Identify mitigation opportunities.
	LOCATION: : Snohomish Estuary
	PARTNERS: Washington State Department of Transportation, Snohomish County
	SOURCE: Snohomish River Basin Salmon Conservation Plan
Snoqualmie River Mainstem Restoration Projects	
Snoqualmie 1b Riparian enhancement site A	DESCRIPTION: Riparian enhancement along the right bank downstream between the boat launch and outlet to Crescent Lake. Currently only a single row of trees. Increase backwater pools along bank.
	LOCATION: Snoqualmie Mouth
	PARTNERS: State
	SOURCE: Snohomish River Basin Salmon Conservation Plan, Appendix J – Project Ideas & Opportunities List, Snohomish County staff
Snoqualmie Mouth culvert replacements	DESCRIPTION: Two fish barriers have been identified in the subbasin. Tributaries with barriers include Cocker Creek and Pearson Eddy Creek.
	LOCATION: Snoqualmie Mouth
	PARTNERS: State
	SOURCE: Snohomish River Basin Salmon Conservation Plan, Appendix J – Project Ideas & Opportunities List, Snohomish County Culvert Analysis
Riley Slough enhancements	DESCRIPTION: Additional planting and passage improvements. Replace eight culverts with concrete slab bridges. Conservation District has already done several projects. Increase flow through slough (tied in with Haskell Slough).
	LOCATION: Snoqualmie Mouth
	PARTNERS: Snohomish Conservation District
	SOURCE: Snohomish River Basin Salmon Conservation Plan, Appendix J – Project Ideas & Opportunities List, SRFB proposal funded
DeJong/Eppinga floodplain reconnection	DESCRIPTION: 560 acres were acquired (DeJong, Eppinga), some for restoration and some for mitigation. The area is currently bermed and tide-gated along two miles of riverfront. Historically, it was a vast palustrine marsh. Remove floodgates and bank armoring adjacent to properties, incorporate LWD and replant riparian forest to improve channel structure and increase backwater pool area. Assume 20% of the site would contain off-channel habitat, if restored.
	LOCATION: Snoqualmie Mouth
	PARTNERS: CLC/Duck s Unlimited, private
	SOURCE: Snohomish River Basin Salmon Conservation Plan, Appendix J – Project Ideas & Opportunities List, SRFB proposal
Snoqualmie Mouth Engineered Log Jams (EJL)	DESCRIPTION: Construct ELJs (10) to form holding pools and add channel complexity. Short-term measure to jump-start the restoration process. Not likely to be a boating hazard because of the low velocities in the reach.
	LOCATION: Snoqualmie Mouth
	PARTNERS: County/State
	SOURCE: Snohomish River Basin Salmon Conservation Plan, Appendix J – Project Ideas & Opportunities List, County staff
Snoqualmie River Riparian Restoration at Cherry Creek Equestrian Center	DESCRIPTION: One mile riparian restoration up from Cherry Creek. 25-foot buffer. Invasive removal, fencing and riparian. WDFW landowner incentive fund.
	LOCATION: Snoqualmie Mouth
	PARTNERS: Stewardship
	SOURCE: Snohomish River Basin Salmon Conservation Plan, Appendix J – Project Ideas & Opportunities List, Snoqualmie meeting 2/22/2004
Snohomish River Mainstem Restoration Projects	
Restore a portion of	DESCRIPTION: Best opportunity around pump station and Wood Creek near Lowell. High

Marshland as wetland/off channel pond	benefit because one of few opportunities to recreate off-channel habitat along mainstem. Thousands of acres of off-channel habitat historically. High cost because the tide-gate would need to be moved or redone.
	LOCATION: Lower Snohomish River/Marshland
	PARTNERS: Everett, private
	SOURCE: Snohomish River Basin Salmon Conservation Plan, Appendix J – Project Ideas & Opportunities, Haas 2001; Toth 2002
Marshland Pump-Station fish passage	DESCRIPTION: Provide fish access by modernizing the facility with fish passage technology, leaving it open a portion of the day or year, or constructing a bypass channel.
	LOCATION: Lower Snohomish River/Marshland
	PARTNERS: Diking District
	SOURCE: Snohomish River Basin Salmon Conservation Plan, Appendix J – Project Ideas & Opportunities, Toth 2002
Norwegian Bay off-channel improvements	DESCRIPTION: Remove bank armor, incorporate LWD, excavate off-channel habitat, and additional planting in vicinity of Norwegian Bay on the riverside of the Snohomish River Rd. Adjacent property in County and private ownership.
	LOCATION: Lower Snohomish River/Marshland
	PARTNERS: County, private
	SOURCE: Snohomish River Basin Salmon Conservation Plan, Appendix J – Project Ideas & Opportunities, Staff, mainstem project idea workshop
Mud Bay off-channel improvements	DESCRIPTION: Dike setback and reforestation in vicinity of Mud Bay. Adjacent property in County and private ownership. Mud Bay is an oxbow channel. It is one of the areas of greatest habitat complexity along the lower mainstem. Adjacent properties are on the river side of river road.
	LOCATION: Lower Snohomish River/Marshland
	PARTNERS: County, private
	SOURCE: Snohomish River Basin Salmon Conservation Plan, Appendix J – Project Ideas & Opportunities, Staff, mainstem project idea workshop
Snohomish Wastewater Plant planting and wetland enhancement project	DESCRIPTION: Enhance habitat conditions adjacent to the dike surrounding the wastewater lagoon by removing invasive plants and planting natives. Planting and LWD placement to improve functions and values of the wetland at the mouth of Cemetery Creek.
	LOCATION: Lower Snohomish River/Marshland
	PARTNERS: City of Snohomish
	SOURCE: Snohomish River Basin Salmon Conservation Plan, Appendix J – Project Ideas & Opportunities
Snohomish City shop yard restoration	DESCRIPTION: Restore riparian forest conditions, remove non-native vegetation, and incorporate LWD jams along the bank to add habitat complexity for juvenile and out-migrating salmonids.
	LOCATION: Lower Snohomish River/Marshland
	PARTNERS: City of Snohomish
	SOURCE: Snohomish River Basin Salmon Conservation Plan, Appendix J – Project Ideas & Opportunities
Cady Park Restoration	DESCRIPTION: Riparian and stream bank restoration in this Snohomish City Park to prevent bank erosion and add complexity using LWD.
	LOCATION: Lower Snohomish River/Marshland
	PARTNERS: City of Snohomish
	SOURCE: Snohomish River Basin Salmon Conservation Plan, Appendix J – Project Ideas & Opportunities
Restoration at Kila Ha Ya Park	DESCRIPTION: Riparian planting and removal of non-native vegetation in a small riverside park.
	LOCATION: Lower Snohomish River/Marshland
	PARTNERS: City of Snohomish
	SOURCE: Snohomish River Basin Salmon Conservation Plan, Appendix J – Project Ideas & Opportunities
Restoration at City of Snohomish Urban Horticulture Property	DESCRIPTION: Potential site for riparian enhancement.
	LOCATION: Lower Snohomish River/Marshland
	PARTNERS: City of Snohomish, Private
	SOURCE: Snohomish River Basin Salmon Conservation Plan, Appendix J – Project Ideas & Opportunities
Batt Slough	DESCRIPTION: Two-tide gates block habitat currently, but access could be restored if tide gates

reconnection	were left open seasonally or during low and moderate flows. May require a small amount of excavation and planting. A rowing racecourse has also been proposed for the site.
	LOCATION: Lower Snohomish River/Marshland
	PARTNERS: Private
	SOURCE: Snohomish River Basin Salmon Conservation Plan, Appendix J – Project Ideas & Opportunities, Staff, mainstem project idea workshop
Riparian planting near mouth of Batt Slough	DESCRIPTION: Riparian planting on outside of dike. Incorporate LWD to add complexity along the channel edge. Incorporate LWD into bank to add edge habitat complexity.
	LOCATION: Lower Snohomish River/Marshland
	PARTNERS: Private
	SOURCE: Snohomish River Basin Salmon Conservation Plan, Appendix J – Project Ideas & Opportunities, Staff, mainstem project idea workshop
Riparian planting and fencing downstream of Pilchuck River	DESCRIPTION: Incorporate LWD into bank to add edge habitat complexity.
	LOCATION: Lower Snohomish River/Marshland
	PARTNERS: Private
	SOURCE: Snohomish River Basin Salmon Conservation Plan, Appendix J – Project Ideas & Opportunities, Staff, mainstem project idea workshop
Lower Snohomish riparian planting site A	DESCRIPTION: Riparian planting and livestock fencing on left bank across river from French Creek and Pilchuck River. Incorporate LWD into bank to add edge habitat complexity.
	LOCATION: Lower Snohomish River/Marshland
	PARTNERS: Private
	SOURCE: Snohomish River Basin Salmon Conservation Plan, Appendix J – Project Ideas & Opportunities, Staff, mainstem project idea workshop
Marshland creeks LWD placement	DESCRIPTION: LWD placement to add complexity and help prevent further incision.
	LOCATION: Lower Snohomish River/Marshland
	PARTNERS: Private
	SOURCE: Snohomish River Basin Salmon Conservation Plan, Appendix J – Project Ideas & Opportunities, Staff, mainstem project idea workshop
Lower Snohomish /Marshland culvert replacements	DESCRIPTION: Five fish barriers have been identified; three are total blockages. More are likely to exist. Barriers are often located along the Lowell-Larimer Rd and at sediment settling ponds.
	LOCATION: Lower Snohomish River/Marshland
	PARTNERS: Snohomish County
	SOURCE: Snohomish River Basin Salmon Conservation Plan, Appendix J – Project Ideas & Opportunities, Snohomish County Culvert analysis
Thomas's Eddy floodplain enhancement	DESCRIPTION: Increase floodplain connectivity and off-channel habitat quality at Thomas's Eddy at the County Park. Replant riparian habitat and increase flow through Shadow Lake.
	LOCATION: Upper Snohomish River/Cathcart
	PARTNERS: Snohomish County
	SOURCE: Snohomish River Basin Salmon Conservation Plan, Appendix J – Project Ideas & Opportunities, Snohomish County Confluence Reach Analysis Project
Twin River's Quarry floodplain/off-channel habitat reconnection and riparian planting	DESCRIPTION: Riparian planting along side-channel has already occurred. Opportunity to increase connectivity of side-channel and remove riprap along bank.
	LOCATION: Upper Snohomish River/Cathcart
	PARTNERS: Snohomish County
	SOURCE: Snohomish River Basin Salmon Conservation Plan, Appendix J – Project Ideas & Opportunities, Snohomish County Confluence Reach Analysis Project
Crabb bend floodplain /off-channel habitat reconnection and riparian planting	DESCRIPTION: A side channel on the site is disconnected. If acquired, a dike could be removed to provide for greater habitat complexity.
	LOCATION: Upper Snohomish River/Cathcart
	PARTNERS: Snohomish County, private
	SOURCE: Snohomish River Basin Salmon Conservation Plan, Appendix J – Project Ideas & Opportunities, Snohomish County Confluence Reach Analysis Project
Non-native predatory fish removal from off channel ponds	DESCRIPTION: Lake Beecher, Shadow Lake and other oxbows are stocked with bass that prey upon juvenile salmon.
	LOCATION: Upper Snohomish River/Cathcart
	PARTNERS: Snohomish County

	SOURCE: Snohomish River Basin Salmon Conservation Plan, Appendix J – Project Ideas & Opportunities, Staff, mainstem project idea workshop
Riparian planting around Lake Beecher	DESCRIPTION: Improve connectivity with river and Shadow Lake.
	LOCATION: Upper Snohomish River/Cathcart
	PARTNERS: Snohomish County
	SOURCE: Snohomish River Basin Salmon Conservation Plan, Appendix J – Project Ideas & Opportunities, Staff, mainstem project idea workshop
Confluence Reach side-channel riparian enhancement	DESCRIPTION: Riparian enhancement along long large left bank Secondary channel.
	LOCATION: Upper Snohomish River/Cathcart
	PARTNERS: Private
	SOURCE: Snohomish River Basin Salmon Conservation Plan, Appendix J – Project Ideas & Opportunities, Staff, mainstem project idea workshop
Confluence reach floodplain tributary enhancement	DESCRIPTION: Reforest and reconfigure floodplain tributaries that have been ditched. Ricci and several other landowners.
	LOCATION: Upper Snohomish River/Cathcart
	PARTNERS: Private
	SOURCE: Snohomish River Basin Salmon Conservation Plan, Appendix J – Project Ideas & Opportunities, Staff, mainstem project idea workshop
Upper Snohomish/Cathcart culvert replacements	DESCRIPTION: Remove numerous blocking culverts identified along Ricci, Evans, Elliott and Anderson creeks. Twelve culverts within the subbasin have been identified as fish barriers. Half are partial barriers and half are total barriers. Mixture of State, County and private. One is located within a half mile of the mainstem. Many more likely exist, but have not yet been identified.
	LOCATION: Upper Snohomish River/Cathcart
	PARTNERS: State, County, private
	SOURCE: Snohomish River Basin Salmon Conservation Plan, Appendix J – Project Ideas & Opportunities, Snohomish County Culvert analysis
Pilchuck River Restoration Projects	
Pilchuck River at OK Mill Road Bridge ELJs	DESCRIPTION: Use ELJs to shift the thalweg for the purpose of increasing habitat complexity (holding pools and edge habitat), reducing the need for bank armoring, and protecting the bridge. Similar in concept to the NF Stillaguamish project at C post bridge.
	LOCATION: Pilchuck River – Middle
	PARTNERS: Snohomish County
	SOURCE: Snohomish River Basin Salmon Conservation Plan, Appendix J – Project Ideas & Opportunities, Pilchuck Wood Capture Study
Beach Road Meander reconnection	DESCRIPTION: It has been disconnected by natural and anthropogenic causes. A small amount of fill appears to have been placed in the channel. The current landowner at the downstream end of the oxbow is interested in the concept of reconnecting the slough. The proposed project would involve removing the fill at the downstream end and places three ELJs to add complexity and keep the channel open.
	LOCATION: Pilchuck River – Middle
	PARTNERS: Snohomish County, Private
	SOURCE: Snohomish River Basin Salmon Conservation Plan, Appendix J – Project Ideas & Opportunities, Pilchuck Wood Capture Study
Conner Lake reach ELJ placement	DESCRIPTION: ELJ placement to promote channel bifurcation. The County owns forested property on both sides of the river at roughly RM 12. The placement of ELJs would promote side channel formation to increase channel complexity. Bank armoring and channel modification has reduced reach length by one third since 1933
	LOCATION: Pilchuck River – Middle
	PARTNERS: Snohomish County
	SOURCE: Snohomish River Basin Salmon Conservation Plan, Appendix J – Project Ideas & Opportunities, Pilchuck Wood Capture Study
Glover Farm habitat enhancement	DESCRIPTION: The river is hydro modified on both sides through this property. An opportunity exists to remove hydro modification, replant the riparian zone and place ELJs (assume three) to encourage side-channel and pool formation if acquired. This reach has significant Chinook spawning that is threatened by ATVs driving across riffles.
	LOCATION: Pilchuck River – Middle

	PARTNERS: Private
	SOURCE: Snohomish River Basin Salmon Conservation Plan, Appendix J – Project Ideas & Opportunities, Pilchuck Wood Capture Study
Smith Meander Acquisition	DESCRIPTION: Acquisition or conservation easement to protect some of the best riparian forest and channel conditions in the Middle Pilchuck River subbasin. High frequencies of Chinook salmon have been observed in this reach.
	LOCATION: Pilchuck River – Middle
	PARTNERS: Snohomish County, Private
	SOURCE: Snohomish River Basin Salmon Conservation Plan, Appendix J – Project Ideas & Opportunities, Pilchuck Wood Capture Study
Middle Pilchuck Culvert Replacements	DESCRIPTION: Seven culverts have been identified that block fish habitat. Four are on State roads and three on County roads. Two are within a half mile of the mainstem. Many more likely exist, but have not yet been identified. Primary benefit for Coho.
	LOCATION: Pilchuck River – Middle
	PARTNERS: State, Snohomish County
	SOURCE: Snohomish River Basin Salmon Conservation Plan, Appendix J – Project Ideas & Opportunities, Snohomish County Culvert Analysis
Lower Pilchuck River	DESCRIPTION: There is a problem in this reach of the Pilchuck River. LWD placement would increase complexity and prevent further migration of a channel meander toward Dubuque Rd, thus reducing the need for rock deflectors or bank armoring. Engineered logjams (assume two) could be placed upstream to redirect the thalweg in a channel along the right bank away from existing infrastructure.
	LOCATION: Lower Pilchuck River
	PARTNERS: Snohomish County
	SOURCE: Snohomish River Basin Salmon Conservation Plan, Appendix J – Project Ideas & Opportunities
Pilchuck 6 ELJs	DESCRIPTION: LWD placement in this reach would help change the reach characteristics from plane bed to forced pool riffle. Lack of wood currently has contributed to homogenous habitat lacking pools (assume five ELJs).
	LOCATION: Lower Pilchuck River
	PARTNERS: State
	SOURCE: Snohomish River Basin Salmon Conservation Plan, Appendix J – Project Ideas & Opportunities, Savery and Hook, 2003
Pilchuck ELJs	DESCRIPTION: Replace groins at upstream (RK 7.7) and downstream (RK 7.5) ends of meander cutoff with debris jams to increase holding pool frequency and complexity of habitat (assume two ELJs).
	LOCATION: Lower Pilchuck River
	PARTNERS: Unknown
	SOURCE: Snohomish River Basin Salmon Conservation Plan, Appendix J – Project Ideas & Opportunities, Savery and Hook, 2003
Restoration at Pilchuck Park	DESCRIPTION: Stream bank revegetation and removal of invasive plants would help stabilize eroding levees. Limiting access points along river to reduce trampling. Incorporation of LWD. Implementation of this recommendation will require cooperation from the French Creek Diking District.
	LOCATION: Lower Pilchuck River
	PARTNERS: City of Snohomish
	SOURCE: Snohomish River Basin Salmon Conservation Plan, Appendix J – Project Ideas & Opportunities
Restoration at City Open Space	DESCRIPTION: Improve floodplain and instream habitat complexity. Use LWD to enhance side-channel complexity and revegetation with native plants. Potentially link this project to a levee setback project downstream.
	LOCATION: Lower Pilchuck River
	PARTNERS: City of Snohomish
	SOURCE: Snohomish River Basin Salmon Conservation Plan, Appendix J – Project Ideas & Opportunities
Restoration at Morgantown Park	DESCRIPTION: This city park has the highest quality existing riparian area on the Pilchuck River downstream of Bunk Foss Creek. High priority location for LWD placement to add channel

	<p>complexity to the long homogenous glide adjacent to the park. The pastureland on the opposite bank could potentially allow significant levee setbacks with riparian restoration, possibly through the Conservation Reserve Enhancement Program.</p> <p>LOCATION: Lower Pilchuck River</p> <p>PARTNERS: City of Snohomish</p> <p>SOURCE: Snohomish River Basin Salmon Conservation Plan, Appendix J – Project Ideas & Opportunities</p>
Restoration at Old Pump House Property	<p>DESCRIPTION: This city owned property offers an excellent opportunity for LWD placement to increase channel complexity at the upper end of the glide. Opportunities for levee setback may also occur on the opposite bank in this location.</p> <p>LOCATION: Lower Pilchuck River</p> <p>PARTNERS: City of Snohomish</p> <p>SOURCE: Snohomish River Basin Salmon Conservation Plan, Appendix J – Project Ideas & Opportunities</p>
Restoration at Mouth of Bunk Foss Creek	<p>DESCRIPTION: Prime opportunities for habitat improvement. There are public ownership/easements on both sides of the river (through BPA and City of Everett). Riparian plantings and placement of LWD to increase channel complexity and provide cover. The American Legion RV park property downstream of the Bunk Foss confluence is potentially another candidate for levee setback.</p> <p>LOCATION: Lower Pilchuck River</p> <p>PARTNERS: City of Snohomish, City of Everett, BPA</p> <p>SOURCE: Snohomish River Basin Salmon Conservation Plan, Appendix J – Project Ideas & Opportunities</p>
Restoration of Lower Bunk Foss Creek	<p>DESCRIPTION: Properties near the mouth of Bunk Foss Creek present substantial opportunities for improvements in stream and riparian habitat. Below Old Machias Road, the creek has incised a deep and simplified channel and eroded stream banks have little to no riparian vegetation. Aside from one small horse farm, adjoining land in this area is all publicly owned (the Snohomish County Sheriff's Department, Snohomish County Parks, Snohomish County PUD and the Bonnevillie Power Administration).</p> <p>LOCATION: Lower Pilchuck River</p> <p>PARTNERS: City of Snohomish, Snohomish County, Private</p> <p>SOURCE: Snohomish River Basin Salmon Conservation Plan, Appendix J – Project Ideas & Opportunities</p>
Bunk Foss Creek In-Channel Wood Augmentation	<p>DESCRIPTION: South of US2, where recommendations in the ESA Strategy are focused, the highest priority location for placing woody debris is in lower Bunk Foss Creek, where Coho salmon spawn and rear in the largest numbers.</p> <p>LOCATION: Lower Pilchuck River</p> <p>PARTNERS: City of Snohomish</p> <p>SOURCE: Snohomish River Basin Salmon Conservation Plan, Appendix J – Project Ideas & Opportunities</p>
52nd Street SE Culvert	<p>DESCRIPTION: A culvert beneath 52nd Street SE blocks fish passage to the best spawning habitat in Bunk Foss Creek.</p> <p>LOCATION: Lower Pilchuck River</p> <p>PARTNERS: City of Snohomish</p> <p>SOURCE: Snohomish River Basin Salmon Conservation Plan, Appendix J – Project Ideas & Opportunities</p>
Clarks Fork Culvert Removal	<p>DESCRIPTION: Clarks Fork flows north out of the City of Snohomish and enters the mainstem creek at the wetland just upstream of the upstream-most US2 culvert. About 100 meters upstream of this confluence there is a perched culvert that is a total barrier to fish passage. The culvert is on private property just north of the UGA; it currently serves no purpose, since the road it passes under is not in use.</p> <p>LOCATION: Lower Pilchuck River</p> <p>PARTNERS: City of Snohomish</p> <p>SOURCE: Snohomish River Basin Salmon Conservation Plan, Appendix J – Project Ideas & Opportunities</p>
Pilchuck River Upper Culvert Replacements	<p>DESCRIPTION: 27 blocking culverts have been identified. Most block very short lengths of stream.</p>

	LOCATION: Upper Pilchuck River
	PARTNERS: State
	SOURCE: Snohomish River Basin Salmon Conservation Plan, Appendix J – Project Ideas & Opportunities
Dubuque Creek culvert replacement	DESCRIPTION: One blocking culvert has been identified on a state road.
	LOCATION: Dubuque Creek
	PARTNERS: State
	SOURCE: Snohomish River Basin Salmon Conservation Plan, Appendix J – Project Ideas & Opportunities
Skykomish River – Mainstem Restoration Projects	
Sky 1 off-channel enhancement site A	DESCRIPTION: Improve access and quality of off-channel ponds directly upstream of the confluence of Snoqualmie and Skykomish rivers along the right bank by removing a small amount of fill and replacing culverts (2) and planting several acres of trees. The Conservation District replaced one blockage. Several more may exist higher up in the pond network.
	LOCATION: Skykomish River – Lower Mainstem
	PARTNERS: Private
	SOURCE: Snohomish River Basin Salmon Conservation Plan, Appendix J – Project Ideas & Opportunities, Staff, mainstem project idea workshop
Sky 1 rip/edge enhancement site A	DESCRIPTION: Riparian and edge habitat enhancement (replace rock, incorporate LWD, flood fencing) along the right bank downstream of Hanson Farm.
	LOCATION: Skykomish River – Lower Mainstem
	PARTNERS: Private
	SOURCE: Snohomish River Basin Salmon Conservation Plan, Appendix J – Project Ideas & Opportunities, Staff, mainstem project idea workshop
Davis floodplain mitigation bank	DESCRIPTION: Remove Hanson dike, replant, and restore connectivity to off-channel habitat. Proposed as a three-phased mitigation project: some side channels, some dike removal and more side-channels, full dike removal and reconnection of wall-based channel. Owned by Steve Davis. Would help with erosion issue on Werkhoven farm if implemented.
	LOCATION: Skykomish River – Lower Mainstem
	PARTNERS: Private
	SOURCE: Snohomish River Basin Salmon Conservation Plan, Appendix J – Project Ideas & Opportunities, Steve Davis, mitigation bank proposal
Sky 1 rip/edge enhancement B	DESCRIPTION: Mainstem rip/edge B: Further riparian and edge habitat enhancement along the left bank along Werkhoven farm. Bank is eroding. Landowner concerned about loss of land needed for manure management.
	LOCATION: Skykomish River – Lower Mainstem
	PARTNERS: Snohomish County, Private
	SOURCE: Snohomish River Basin Salmon Conservation Plan, Appendix J – Project Ideas & Opportunities, Staff, mainstem project idea workshop
Cadman secondary-channel improvement	DESCRIPTION: Direct more flow through secondary-channel at head of bar adjacent to Cadman to enhance rearing year-round. Would potentially reduce erosion at Werkhoven Farm. Perhaps would help prevent erosion on opposite bank.
	LOCATION: Skykomish River – Lower Mainstem
	PARTNERS: City of Monroe / DNR
	SOURCE: Snohomish River Basin Salmon Conservation Plan, Appendix J – Project Ideas & Opportunities, Staff, mainstem project idea workshop
Cadman wall-based channel reconnection	DESCRIPTION: May be substantial opportunity to reconnect a wall based channel and off-channel habitat on the quarry site once Cadman operations are complete.
	LOCATION: Skykomish River – Lower Mainstem
	PARTNERS: City of Monroe / Private
	SOURCE: Snohomish River Basin Salmon Conservation Plan, Appendix J – Project Ideas & Opportunities, Staff, mainstem project idea workshop
Haskell Slough summer flow improvement	DESCRIPTION: Direct more flow through Haskell Slough (large side channel) to enhance rearing year-round. Opportunities are being explored (Reiner and Sayer). Also, increase flow into Riley Slough.
	LOCATION: Skykomish River – Lower Mainstem

	PARTNERS: Private
	SOURCE: Snohomish River Basin Salmon Conservation Plan, Appendix J – Project Ideas & Opportunities, Lower Sky HCP group
Haskell Slough riparian enhancement	DESCRIPTION: Additional tree planting along Haskell Slough to provide shade and eventually LWD.
	LOCATION: Skykomish River – Lower Mainstem
	PARTNERS: Private
	SOURCE: Snohomish River Basin Salmon Conservation Plan, Appendix J – Project Ideas & Opportunities, Staff, mainstem project idea workshop
BNSF Railroad bridge and grade removal	DESCRIPTION: Remove abandoned railroad bridge and grade just upstream of the mouth of Woods Creek. It constricts flow and could fail if not addressed. It is owned by DNR. Explore opportunities for non-salmon related funding. Railroad fill on the approach restricts side-channel formation/channel braiding. City of Monroe currently in discussion with DNR.
	LOCATION: Skykomish River – Lower Mainstem
	PARTNERS: State DNR
	SOURCE: Snohomish River Basin Salmon Conservation Plan, Appendix J – Project Ideas & Opportunities, Staff, mainstem project idea workshop
Buck Island side-channel enhancement	DESCRIPTION: Increase connectivity along Buck Island between Woods Creek and the mainstem. Strategically placed LWD to promote side-channel and pool formation.
	LOCATION: Skykomish River – Lower Mainstem
	PARTNERS: Private
	SOURCE: Snohomish River Basin Salmon Conservation Plan, Appendix J – Project Ideas & Opportunities, Staff, mainstem project idea workshop
SR-2 oxbow reconnections	DESCRIPTION: Provide access to oxbow channels that are cut off by State Route 2 and the railroad. Probably more costly than other similar projects because it would require the installation of large culverts under a major highway.
	LOCATION: Skykomish River – Lower Mainstem
	PARTNERS: Federal, State, Private
	SOURCE: Snohomish River Basin Salmon Conservation Plan, Appendix J – Project Ideas & Opportunities, Staff, mainstem project idea workshop
Fern Bluff side-channel improvements	DESCRIPTION: Improve access to the side-channel behind Fern Bluff levee. County has maintenance responsibility for levee. Small creek flows into side channel. It is probably accessible from downstream end. Connection at upstream end is unknown.
	LOCATION: Skykomish River – Lower Mainstem
	PARTNERS: Snohomish County, Private
	SOURCE: Snohomish River Basin Salmon Conservation Plan, Appendix J – Project Ideas & Opportunities, Staff, mainstem project idea workshop
Sky 2 rip/edge/off-channel A	DESCRIPTION: Improve access to off-channel habitat and restore the riparian forest along the left bank across from the Fern Bluff levee. Property owners Klock and Bar. A 20-ft. riparian corridor was already planted. Beaver have eaten many plants and caused flooding.
	LOCATION: Skykomish River – Lower Mainstem
	PARTNERS: Snohomish County, Private
	SOURCE: Snohomish River Basin Salmon Conservation Plan, Appendix J – Project Ideas & Opportunities, Staff, mainstem project idea workshop
Klock farm oxbow reconnection	DESCRIPTION: Oxbow channel reconnection on Klock's farm along the left bank across the river and upstream of the Fern Bluff levee. Became an oxbow in 1950s. Isolated by a dike. Landowner willing to discuss opportunities to reconnect. Wants to maintain access to fields.
	LOCATION: Skykomish River – Lower Mainstem
	PARTNERS: Snohomish County, Private
	SOURCE: Snohomish River Basin Salmon Conservation Plan, Appendix J – Project Ideas & Opportunities, Lower Sky HCP group
Lavish Farm secondary channel enhancement	DESCRIPTION: There is already a conservation easement. Add complexity and pools through placement of LWD.
	LOCATION: Skykomish River – Lower Mainstem
	PARTNERS: Private
	SOURCE: Snohomish River Basin Salmon Conservation Plan, Appendix J – Project Ideas & Opportunities, Staff, mainstem project idea workshop

Groenveld Slough Enhancement	DESCRIPTION: increase quantity and quality of side-channel habitat. Downstream of Sultan training levee. Landowner is interested in a project. Would like to address a flooding concern at same time.
	LOCATION: Skykomish River – Lower Mainstem
	PARTNERS: Private
	SOURCE: Snohomish River Basin Salmon Conservation Plan, Appendix J – Project Ideas & Opportunities, Lower Sky HCP group
South Slough Riparian Enhancement	DESCRIPTION: Riparian enhancement and LWD placement along South Slough (large side channel).
	LOCATION: Skykomish River – Lower Mainstem
	PARTNERS: Private
	SOURCE: Snohomish River Basin Salmon Conservation Plan, Appendix J – Project Ideas & Opportunities, Staff, mainstem project idea workshop
Shingleboat Slough Enhancement (Map 12 id #22)	DESCRIPTION: Remove fill incorporate LWD into Shingleboat Slough located south of Sultan. Groenveld is a major landowner.
	LOCATION: Skykomish River – Lower Mainstem
	PARTNERS: City of Sultan, Private
	SOURCE: Snohomish River Basin Salmon Conservation Plan, Appendix J – Project Ideas & Opportunities, Staff, mainstem project idea workshop
Acquisitions of properties in the braided reach floodway	DESCRIPTION: Acquisition to protect critical habitat and provide public safety in the most active area of channel migration in the basin. Mix of forest and rural residential and agriculture. Skyview tracks are a potential site for acquisition. Willing seller has been identified in vicinity of Shinglebolt Slough.
	LOCATION: Skykomish River – Lower Mainstem
	PARTNERS: Snohomish County, Private
	SOURCE: Snohomish River Basin Salmon Conservation Plan, Appendix J – Project Ideas & Opportunities, Cascade Land Conservancy, Snohomish County
Sky River Lower Mainstem subbasin culvert replacements	DESCRIPTION: Three culverts within the subbasin have been identified as fish barriers (one full blockage; two partial). All are on paved state roads. None are within a half mile of the mainstem. Greatest benefit for Coho. Many more likely exist.
	LOCATION: Skykomish River – Lower Mainstem
	PARTNERS: unspecified
	SOURCE: Snohomish River Basin Salmon Conservation Plan, Appendix J – Project Ideas & Opportunities, Snohomish County Culvert Analysis
Foothill development rights	DESCRIPTION: Acquisition of development rights south of the river to prevent conversion from forestland to home sites.
	LOCATION: Skykomish River – Lower Mainstem
	PARTNERS: CLC, Private
	SOURCE: Snohomish River Basin Salmon Conservation Plan, Appendix J – Project Ideas & Opportunities, Staff, mainstem project idea workshop
Sky Lower Mainstem ELJs	DESCRIPTION: Use LWD structures to increase habitat complexity (holding pools and edge habitat); reconnect side-channels and ponds and direct flow away from armored banks on SR-2 and the railroad. Could be used to protect infrastructure in addition to creating habitat. Further discussion needed with recreational boating community.
	LOCATION: Skykomish River – Lower Mainstem
	PARTNERS: DNR
	SOURCE: Snohomish River Basin Salmon Conservation Plan, Appendix J – Project Ideas & Opportunities, Staff, mainstem project idea workshop
Sky Upper Mainstem ELJs	DESCRIPTION: Use LWD structures to increase habitat complexity (holding pools and edge habitat), and direct flow away from armored banks on SR-2 and the railroad and failing clay bank. Could be used to protect infrastructure in addition to creating habitat. Further discussion needed with recreational boating community.
	LOCATION: Skykomish River – Upper Mainstem
	PARTNERS: DNR
	SOURCE: Snohomish River Basin Salmon Conservation Plan, Appendix J – Project Ideas & Opportunities, Staff, mainstem project idea workshop
Sky Upper Culvert	DESCRIPTION: Three blocking culverts have been identified. Two are located within a half mile

Replacements	of the mainstem.
	LOCATION: Skykomish River – Upper Mainstem
	PARTNERS: State
	SOURCE: Snohomish River Basin Salmon Conservation Plan, Appendix J – Project Ideas & Opportunities
Skykomish River – South Fork Restoration Projects	
SF Sky 3 ELJs	DESCRIPTION: Use LWD structures to increase habitat complexity (holding pools and edge habitat) and direct flow through channel braids away from SR-2 and the railroad. Could be used to protect infrastructure in addition to creating habitat. Further discussion needed with recreational boating.
	LOCATION: Skykomish River – South Fork
	PARTNERS: State
	SOURCE: Snohomish River Basin Salmon Conservation Plan, Appendix J – Project Ideas & Opportunities, Staff, mainstem project idea workshop
BNSF RR maintenance site water quality cleanup	DESCRIPTION: unspecified
	LOCATION: Skykomish River – South Fork
	PARTNERS: BNSF
	SOURCE: Snohomish River Basin Salmon Conservation Plan, Appendix J – Project Ideas & Opportunities
SF Sky 3 Culvert Replacements	DESCRIPTION: Two blocking culverts have been identified within a half mile of the mainstem. One is on a state road and one is private. Many more likely exist, but have not yet been identified.
	LOCATION: Skykomish River – South Fork
	PARTNERS: State, Private
	SOURCE: Snohomish River Basin Salmon Conservation Plan, Appendix J – Project Ideas & Opportunities, Snohomish County Culvert Analysis
SF River- Upper South Fork Culvert Replacement	DESCRIPTION: One blocking culvert has been identified within a half mile of the mainstem. Many more likely exist, but have not yet been identified.
	LOCATION: Skykomish River – South Fork
	PARTNERS: State
	SOURCE: Snohomish River Basin Salmon Conservation Plan, Appendix J – Project Ideas & Opportunities, Snohomish County Culvert Analysis
Skykomish River – North Fork Restoration Projects	
Index bank enhancement	DESCRIPTION: Incorporate LWD into the armored bank protecting the city of Index to increase habitat complexity.
	LOCATION: Skykomish River – Lower North Fork
	PARTNERS: Town of Index, Unknown
	SOURCE: Snohomish River Basin Salmon Conservation Plan, Appendix J – Project Ideas & Opportunities
NF Sky 1 ELJ placement	DESCRIPTION: ELJ placement (assume five) to add habitat complexity, form pools, and move river away from armored banks along road right-of-way. The road follows the reach along much of its length.
	LOCATION: Skykomish River – Lower North Fork
	PARTNERS: Unknown
	SOURCE: Snohomish River Basin Salmon Conservation Plan, Appendix J – Project Ideas & Opportunities
Improve Fish Passage at Wallace River hatchery	DESCRIPTION: Hatchery weir blocks passage to a portion of run. Issue may have been addressed.
	LOCATION: May Creek/ Lower Wallace River
	PARTNERS: WDFW
	SOURCE: Snohomish River Basin Salmon Conservation Plan, Appendix J – Project Ideas & Opportunities
Sultan River Restoration Projects	
Lower Sultan riparian protection	DESCRIPTION: Acquisition to protect intact riparian forest from the Bonneville Power Administration lines down to the City of Sultan.
	LOCATION: Sultan River
	PARTNERS: Private

	SOURCE: Snohomish River Basin Salmon Conservation Plan, Appendix J – Project Ideas & Opportunities
Sultan 1 Culvert replacements	DESCRIPTION: Six blocking culverts have been identified in the subbasin. Two are within a half mile of the mainstem. Many more likely exist.
	LOCATION: Sultan River
	PARTNERS: State
	SOURCE: Snohomish River Basin Salmon Conservation Plan, Appendix J – Project Ideas & Opportunities, Snohomish County Culvert Analysis
Provide fish passage at the City of Everett's diversion dam	DESCRIPTION: Diversion dam for municipal water supply blocks fish passage to at least 6.8 miles of river.
	LOCATION: Sultan River
	PARTNERS: City of Everett
	SOURCE: Snohomish River Basin Salmon Conservation Plan, Appendix J – Project Ideas & Opportunities, Snohomish County Culvert Analysis
Woods Creek Restoration Projects	
WF Woods culvert replacement	DESCRIPTION: Nine blocking culverts have been identified in the culvert database. All are total blockages and 8 are on state roads.
	LOCATION: Woods Creek
	PARTNERS: State
	SOURCE: Snohomish River Basin Salmon Conservation Plan, Appendix J – Project Ideas & Opportunities
Provide passage at Woods Creek – East Falls	DESCRIPTION: Unspecified
	LOCATION: Woods Creek
	PARTNERS: Unknown
	SOURCE: Snohomish River Basin Salmon Conservation Plan, Appendix J – Project Ideas & Opportunities, Bob Heirman, 2004
Woods Creek culvert replacement	DESCRIPTION: 13 blocking culverts have been identified in the culvert database along state roads in rural residential and forested areas.
	LOCATION: Woods Creek
	PARTNERS: Private
	SOURCE: Snohomish River Basin Salmon Conservation Plan, Appendix J – Project Ideas & Opportunities, Bob Heirman, 2004
French Creek Restoration Projects	
French Creek Fish Passage Improvements	DESCRIPTION: Free flow channel except during floods. Fish ladder at pump station has never worked that well. Water quality in lower French Creek has low dissolved oxygen, which is exacerbated, by the pump station. There are over 28 miles of salmon stream in the subbasin. Project would have both a high cost and high benefit. Project proposed by World River Habtech.
	LOCATION: Lower Snohomish River/Marshland
	PARTNERS: World River Habtech, French Creek Diking District
	SOURCE: Snohomish River Basin Salmon Conservation Plan, Appendix J – Project Ideas & Opportunities, Staff, mainstem project idea workshop, World River Habtech
French Creek floodplain wetland restoration	DESCRIPTION: Restore a portion of the 4,000 acres of wetland in the floodplain that were present historically. Project would depend on willing sellers. Project would have both a high cost and high benefit. Project proposed by World River Habtech.
	LOCATION: Lower Snohomish River/Marshland
	PARTNERS: World River Habtech, Private
	SOURCE: Snohomish River Basin Salmon Conservation Plan, Appendix J – Project Ideas & Opportunities, Staff, mainstem project idea workshop
French Creek Tributary riparian restoration	DESCRIPTION: Riparian restoration east of Fryelands Blvd. and south of SR-2. Partnership with Monroe School District, Trout Unlimited, and others.
	LOCATION: French Creek
	PARTNERS: City of Monroe
	SOURCE: Snohomish River Basin Salmon Conservation Plan, Appendix J – Project Ideas & Opportunities, City of Monroe
Fish ditch	DESCRIPTION: behind McDonalds/Chevron Station at SR-2 and Fryelands Blvd. Ongoing

	volunteer project through Sky Valley School.
	LOCATION: French Creek
	PARTNERS: City of Monroe
	SOURCE: Snohomish River Basin Salmon Conservation Plan, Appendix J – Project Ideas & Opportunities, City of Monroe
Quilceda/Allen/Tulalip Drainages – Restoration Projects	
Tulalip and Battle Creek fish passage	DESCRIPTION: (Coho) at hatchery rearing ponds.
	LOCATION: Tulalip and Battle Creeks
	PARTNERS: Tulalip Tribes
	SOURCE: Snohomish River Basin Salmon Conservation Plan, Appendix J – Project Ideas & Opportunities
Mainstem Quilceda riparian habitat	DESCRIPTION: Riparian habitat improvement on county owned parcel just north of 88 th Street NE.
	LOCATION: Quilceda/Allen Creek
	PARTNERS: Snohomish County
	SOURCE: Snohomish River Basin Salmon Conservation Plan, Appendix J – Project Ideas & Opportunities, Snohomish Basin Steward
Mainstem Quilceda riparian restoration	DESCRIPTION: Riparian restoration on property near 111 th Street NE and 51 st Avenue NE, 2 parcels.
	LOCATION: Quilceda/Allen Creek
	PARTNERS: Snohomish County
	SOURCE: Snohomish River Basin Salmon Conservation Plan, Appendix J – Project Ideas & Opportunities, Snohomish Basin Steward
Mainstem Quilceda culvert replacement	DESCRIPTION: Culvert replacement on 51 st Ave NE near 116 th Street NE.
	LOCATION: Quilceda/Allen Creek
	PARTNERS: Snohomish County
	SOURCE: Snohomish River Basin Salmon Conservation Plan, Appendix J – Project Ideas & Opportunities, Snohomish Basin Steward
Mainstem Quilceda riparian restoration	DESCRIPTION: Riparian restoration just south of 132 nd Street NE.
	LOCATION: Quilceda/Allen Creek
	PARTNERS: Snohomish County
	SOURCE: Snohomish River Basin Salmon Conservation Plan, Appendix J – Project Ideas & Opportunities, Snohomish Basin Steward
Mainstem Quilceda riparian restoration on Klein and Stuckey properties	DESCRIPTION: Riparian restoration east of 67 th Ave NE and at approximately 143 rd Street NE.
	LOCATION: Quilceda/Allen Creek
	PARTNERS: Snohomish County
	SOURCE: Snohomish River Basin Salmon Conservation Plan, Appendix J – Project Ideas & Opportunities, Snohomish Basin Steward
Middle Fork Quilceda Creek riparian restoration	DESCRIPTION: Riparian restoration north and south of 138 th Street NE.
	LOCATION: Quilceda/Allen Creek
	PARTNERS: Snohomish County
	SOURCE: Snohomish River Basin Salmon Conservation Plan, Appendix J – Project Ideas & Opportunities, Snohomish Basin Steward
Middle Fork Quilceda Creek riparian restoration	DESCRIPTION: Riparian restoration of county property around 143 rd Street NE.
	LOCATION: Quilceda/Allen Creek
	PARTNERS: Snohomish County
	SOURCE: Snohomish River Basin Salmon Conservation Plan, Appendix J – Project Ideas & Opportunities, Snohomish Basin Steward
Edgecomb Creek riparian restoration	DESCRIPTION: Riparian restoration of entire reach from 67 th Ave NE to confluence with Middle Fork Quilceda Creek.
	LOCATION: Quilceda/Allen Creek
	PARTNERS: Snohomish County
	SOURCE: Snohomish River Basin Salmon Conservation Plan, Appendix J – Project Ideas & Opportunities, Snohomish Basin Steward
Edgecomb Creek culvert replacements	DESCRIPTION: Culvert replacements at 152 nd Street NE. Abandoned farm owned now by developers along 152 nd and the culvert goes under the railroad tracks near 172 nd Street NE.

	LOCATION: Quilceda/Allen Creek
	PARTNERS: Snohomish County
	SOURCE: Snohomish River Basin Salmon Conservation Plan, Appendix J – Project Ideas & Opportunities, Snohomish Basin Steward
	DESCRIPTION: Unspecified
Edgecomb Creek riparian restoration on county owned land	LOCATION: Quilceda/Allen Creek
	PARTNERS: Snohomish County
	SOURCE: Snohomish River Basin Salmon Conservation Plan, Appendix J – Project Ideas & Opportunities, Snohomish Basin Steward
	DESCRIPTION: Riparian restoration from where the creek flows along 67 th to its confluence with the Middle Fork Quilceda Creek on City of Marysville property.
Olaf Strad Creek riparian restoration	LOCATION: Quilceda/Allen Creek
	PARTNERS: Snohomish County
	SOURCE: Snohomish River Basin Salmon Conservation Plan, Appendix J – Project Ideas & Opportunities, Snohomish Basin Steward
	DESCRIPTION: Riparian restoration north of 128 th Street NE.
West Fork Quilceda riparian restoration	LOCATION: Quilceda/Allen Creek
	PARTNERS: Snohomish County
	SOURCE: Snohomish River Basin Salmon Conservation Plan, Appendix J – Project Ideas & Opportunities, Snohomish Basin Steward
	DESCRIPTION: In addition to the specific culverts described above, 20 blocking culverts have been identified in the culvert database. Most are County owned, but additional blockages occur on state and private lands.
Quilceda Culvert replacement	LOCATION: Quilceda/Allen Creek
	PARTNERS: State, Snohomish County, Private
	SOURCE: Snohomish River Basin Salmon Conservation Plan, Appendix J – Project Ideas & Opportunities
	DESCRIPTION: In addition to the specific culverts described above, 20 blocking culverts have been identified in the culvert database. Most are County owned, but additional blockages occur on state and private lands.
Fobes Hill Drainages – Restoration Projects	
Channel Realignment and Restoration of BPA Wetland	DESCRIPTION: Realigning Cemetery Creek west of SR-9 would have multiple benefits including restoring access to 1.8 miles of habitat. This project would be in place of several costly culvert fixes under Highway 9.
	LOCATION: Fobes Hill Drainages
	PARTNERS: City of Snohomish, BPA
	SOURCE: Snohomish River Basin Salmon Conservation Plan, Appendix J – Project Ideas & Opportunities, City of Snohomish ESA Strategy
Wetland and Channel Restoration, Upper Cemetery Creek	DESCRIPTION: Reconstruct a meandering stream channel with complex habitat as Cemetery Creek flows through the 4.3-acre wetland just south of Fobes Road
	LOCATION: Fobes Hill Drainages
	PARTNERS: City of Snohomish
	SOURCE: Snohomish River Basin Salmon Conservation Plan, Appendix J – Project Ideas & Opportunities, City of Snohomish ESA Strategy
Cemetery Creek Dam/Fish Ladder Breach/Removal	DESCRIPTION: Remove, breach or modify to allow water and fish to be passed at all flows. It currently is unused and it blocks access during low flows.
	LOCATION: Fobes Hill Drainages
	PARTNERS: City of Snohomish
	SOURCE: Snohomish River Basin Salmon Conservation Plan, Appendix J – Project Ideas & Opportunities, City of Snohomish ESA Strategy
Lake Stevens Drainages – Restoration Projects	
Lake Stevens Culvert Replacements	DESCRIPTION: 16 blocking culverts have been identified in the database. Culverts are located on State, County and private land. The Drainage Needs report (Snohomish County, 2003) identifies projects.
	LOCATION: Lake Stevens Drainages
	PARTNERS: State, Snohomish County, Private
	SOURCE: Snohomish River Basin Salmon Conservation Plan, Appendix J – Project Ideas & Opportunities, Drainage Needs Report (Snohomish County, 2003)

Table 6: Restoration Projects for Future Consideration (cont.)

WRIA 8 - Stillaguamish Basin	
Note: the WRIA 8 plan is organized differently and recommends project by type and subbasin rather than specific projects at specific locations.	
Riparian Restoration Projects	
Restore 135 acres in Upper North Fork, Squire Creek and French- Segelsen subbasin	Project Types: Overall habitat enhancement: planting native vegetation in riparian corridor; streambank stabilization using native plants; exclusion of livestock; removal and control of noxious weeds; pest control measures. Restore hydrologic processes: inventory and evaluation of existing levees, dikes, roads and railroads for potential removal, relocation or vegetation enhancement. Preservation actions: protect existing riparian corridors with fee-simple or easement acquisition; maintain existing riparian vegetation
Restore 100 acres in Lower South Fork Stillaguamish	
Restore 100 acres in Middle North Fork Stillaguamish	
Nearshore / Estuary Restoration Projects	
Restore 115 acres of salt marsh and blind tidal channel at Leque Island	Project Types: Overall habitat enhancement: restore/enhance blind tidal channels and salt marsh through dike removal and/or setback; restore pocket estuaries; remove bulkheads and enhance native vegetation; construct log jams to enhance tidal channel formation in river delta; remove noxious weeds. Restore hydrologic processes and water quality: removal of existing levees, dikes, revetments; dike setbacks and reconnection to cut-off sloughs; pollution reduction. Preservation actions: protect functioning estuary, pocket estuary, shorelines; fee-simple or easement acquisition.
Restore 80 acres of salt marsh at Nature Conservancy property	
Attempt to create 120 acres of salt marsh using ELJ on mud flats – pilot project	
Large Woody Debris Projects	
5 ELJs in Lower South Fork (upper) (SF3)	Project Types: Habitat Enhancement: ELJs in mainstem rivers to enhance instream habitat; large wood revetments to stabilize stream banks or attenuate landslides; enhance riparian features. Preservation actions: retention of mature forest in floodplain and stream corridors to enhance natural recruitment; fee-simple or easement acquisition.
10 ELJs in French-Segelsen and Middle North Fork (NF 7 & 4)	
2 ELJs at North Meander	
2 ELJs at Smokes Farm	
6 ELJs in Lower South Fork (SF 2)	
18 ELJs in Lower North Fork (NF 2 & 3)	
2 ELJs in North Fork (NF 3 & 5)	
6 ELJs in Lower South Fork (SF 3)	
Floodplain Projects	
Restore 10 acres of new side channel at North Meander and Smokes Farm	Project Types: Habitat Enhancement: restoration of fish access to abandoned side channels and sloughs Hydrologic processes: reconnection of floodplains and forested wetlands to main river channels; dike setbacks and excavation.
Restore 14 acres of new side channel in Lower and Middle North Fork	
Restore 6 acres of new side channel in Lower South Fork	
Remove 4.1 miles of bank	

armoring in N and S Forks	
Sediment Projects	
Landslide remediation at Steelhead Haven – Lower North Fork	Project Types: <ul style="list-style-type: none">Engineered slope stabilization to reduce direct inputs from chronic and deep-seated landslides that are active near main river channelsTargeted (forest) road decommissioning and treatmentWetland restoration to stabilize small tributary sediment regimesPlant riparian vegetation and add LWD to protect and stabilize streambanks
Landslide remediation at Gold Basin – Lower South Fork	
Treat 48 miles of roads in Upper North Fork (federal, state, private)	
Treat 5 miles of roads in French-Segelsen (federal, state, private)	
Treat 11 miles of roads in Deer Creek subbasin (state, private)	
Treat 6 miles of roads in Middle North Fork (state, private)	
Treat 12 miles of roads in Upper Canyon Creek subbasin (federal)	
Treat 7 miles of roads in Robe Valley subbasin (federal)	
Treat 4 miles of roads in Robe Valley subbasin (state, private)	
Treat 3 miles of roads in Lower Canyon Creek subbasin (state, private)	
Hydrology Projects	
Priority areas are Middle North Fork and French-Segelsen	Project types: <ul style="list-style-type: none">Floodplain and wetland restoration in higher elevation watershed upstream of Chinook spawning areas impacted by peak flowsForest protection strategies in the rain-on-snow zone (1000-3000 feet elevation)
Stakeholders and Project Partners	
<ul style="list-style-type: none">Snohomish County – all project typesStillaguamish Tribe – all project typesTulalip Tribes – all project typesWDFW – estuarine wetland restoration, fish passage improvements, riparian fencing, re-vegetation, off-channel rearing, technical assistanceStillaguamish Flood Control District – estuarine, floodplain, riparianSnohomish Conservation District – forest road treatment, riparian, floodplain, BMPsUS Forest Service – forest road treatment, hydrologyDNR - forest road treatment, hydrologyAdopt-a-Stream – riparianStilly-Snohomish Fisheries Enhancement Task Force – riparian, floodplain, side channels,LWD, estuarineStillaguamish Tribe Banksavers – riparianDucks Unlimited – estuarineThe Nature Conservancy – estuarineCity of Arlington – Hydrology, riparian, floodplainDepartment of Ecology – TMDLs, water quality issuesPrivate landowners – all project types	

V. Other Restoration and Preservation Programs

As described earlier, Snohomish County has adopted a multifaceted approach to achieve its shoreline ecological protection objectives utilizing both regulatory and non-regulatory programs.⁷ This approach is carried through in the restoration policies adopted in the County's shoreline management program. This multifaceted approach includes both regulatory and non-regulatory programs. Regulatory Programs include land use codes and enforcement procedures to protect ecological functions at the project level. In addition to watershed and habitat projects, Snohomish County supports a variety of non-regulatory programs that promote restoration including:

- Planning and intergovernmental coordination
- Public education and stewardship
- Incentive programs
- Purchase and acquisition
- Monitoring and adaptive management

The continued support of these programs is an important component of a comprehensive protection and restoration strategy. The following is a description of some of these programs.

Regulatory Programs

Regulatory programs are designed primarily to address protection of existing ecological functions. The required standard is for development to achieve "no net loss" of ecological functions through avoidance of potential impacts or through minimization and mitigation. Restoration is an important tool for mitigating impacts and achieving the "no net loss" standard. While not specifically required by the regulations, the environmental value of restoration is recognized and project permit applications are subject to a relatively streamlined submittal and review process.

The County implements several regulatory programs relevant to protection of shoreline ecological functions: the Shoreline Management Program (SMP), the National Pollution Discharge Elimination System (NPDES), and the State Environmental Policy Act (SEPA). The SMP incorporates the County's critical area regulations to protect shoreline ecological functions. The critical area regulations adopted by the County require that development activities achieve "no net loss" of critical area functions and values. As illustrated in Table 2 above, critical area functions and values are synonymous with the shoreline ecological functions described in WAC 173-26. Regulations adopted to achieve "no net loss" of critical area functions and values will therefore achieve "no net loss" of

⁷ Snohomish County, *General Policy Plan – A Component of the GMA Comprehensive Plan*, 1995, Updated June 20, 2008, pg. NE-1 through NE-20.

shoreline ecological functions. To facilitate ecological restoration and help balance the “no net loss” equation, restoration projects are subject to less rigorous permitting restrictions and requirements.

SMP Policy: Facilitate restoration and enhancement by expediting and simplifying the shoreline permit process for projects that are conducted solely for restoration and enhancement purposes, especially those that benefit critical saltwater and freshwater habitats.

Regulations adopted to meet the requirements under NPDES address stormwater retention, detention and treatment with the goal of maintaining or replicating natural stormwater regimes. The NPDES regulations address flow attenuation and maintenance, discharge to natural surface waters, sedimentation and erosion, and water quality.

Development proposals subject to SEPA are also required to avoid, minimize and mitigate impacts. Under its SEPA authority, the County can require that development activities are conducted in accordance with the County’s SEPA policies. The natural environment policies in the General Policy Plan, which were designed to establish a multifaceted approach to environmental protection, are included as County SEPA policies.⁸

Non-Regulatory Programs

Planning and Intergovernmental Coordination

The County participates in multiple intergovernmental and stakeholder planning efforts including WRIA planning, SIRC, Puget Sound Partnership, Marine Resources Committee, The Ruckelshaus Center, and Agricultural Advisory Board. In addition to those partners listed in Table 6, the County pursues partnerships with the Cascade Land Conservancy, state agencies (WDFW, DNR, DOE), WSU Beach Watchers, Stillaguamish Tribe, Tulalip Tribes, People for Puget Sound, City of Everett, City of Edmonds, City of Mukilteo, City of Arlington, Streamkeepers, Adopt-a-Stream and others.

Public Education and Stewardship

Northwest Stream Center – The County supports and provides facilities for the educational programs provided by the Adopt-a-Stream Foundation and the Northwest Stream Center at McCollum Park. This is a regional environmental education and

⁸ The natural environment policies are found in Chapter 12 of the General Policy Plan (GPP). The GPP is a component of the County’s comprehensive plan, and as such, is adopted as a SEPA policy pursuant to SCC 30.61.230(1).

interpretive facility that focuses on stream and wetlands ecology and fish and wildlife habitat restoration (2007 Snohomish County Comprehensive Parks Plan).

The **Salmon Watch** field experiences focus on educating teachers, students and parents about salmon in local streams. Classes in this program travel to a local salmon spawning stream where they see – often for the first time – salmon migrating to their spawning beds (Snohomish County Surface Water Management Division Website 2009).

The **Salmon and Plants for Kids** program uses streamside restoration and a series of three fieldtrips to teach how native plants improve water quality and wildlife habitat. Students in this program plant and monitor a stream restoration site and assist SWM's Native Plant Program by potting plants at the nursery or salvaging plants from construction sites. These plants are re-planted by students the following year (Snohomish County Surface Water Management Division Website 2009).

The **Native Plant Program** trains volunteers to identify and salvage native plants from areas where they would otherwise be destroyed due to development, roads, or other activities. The salvaged plants are taken to our native plant holding facility for about a year then they are transplanted to stream and riverbanks where they help improve water quality and fish habitat.

The goals of the **Watershed Stewards Program** include facilitating voluntary BMPs by property owners, implementing watershed improvement projects and maintaining community partnerships in areas of mutual concern and benefit. Stewards work with property owners and other stakeholders to identify and target water resource improvements, provide technical assistance and project implementation. Areas of steward emphasis include: Stillaguamish CWD, Snohomish WMA, South County WMA, Marine Resources, and Agricultural Outreach.

The **Education Programs** such as the **Watershed Education Program** and **Shore Stewards Program** seeks to educate shoreline residents about the issues pertinent to shoreline and encourage them to be responsible landowners. The programs help citizens understand the natural processes and adopt watershed- and salmon-friendly actions such as: planting native vegetation along stream banks, teaching others in their community about water and fish issues, collecting and sharing data, raising funds, understanding land use and regulatory processes as they relate to aquatic habitat, water quality, urban drainage and river flooding. Events offered by the Watershed Education Program are designed to help citizens protect and restore aquatic habitat and water quality, and deal with urban drainage problems and river flooding. The county partners with Puget Sound Partnership, WSU Beach Watchers, Snohomish County Public Works, Stillaguamish Tribe, Tulalip Tribes, People for Puget Sound, and Rosary

Heights Nunnery, City of Everett, City of Edmonds, City of Mukilteo, and others to conduct **Landowner Workshops**. The half-day workshops educate shoreline landowners on issues such as landslides, vegetation on slopes, natural lawn care, and low impact development.

The **Lake Management Program** provides a variety of lake monitoring and management services, including monitoring the water quality of lowland lakes, conducting detailed lake restoration studies, taking actions to control invasive aquatic plants, providing public education, volunteer monitoring and technical assistance to lake groups and lakeside residents, preparing reports analyzing the condition of county lakes.

The **Marine Resources Management Program's** primary goal is to protect and restore the marine waters, habitats, and species off the shores of Snohomish County. We investigate marine resource-related concerns and recommend remedial actions to local authorities and property owners. County Surface Water Management staff are available to provide technical assistance, advice and ideas to shoreline landowners on issues related to: bluff management, bulkheads and softshore armoring, riparian vegetation, marine life, water quality and beach restoration (Snohomish County Surface Water Management Division Website 2009). For additional information, see Appendix C.

Incentive Programs

Open Space / Current Use Property Tax Program. The County has adopted policies and designation criteria⁹ to implement chapter 84.34 RCW, providing reduced property taxes for lands maintained in natural condition.

Stream corridors, lake and saltwater shorelines, wetlands, wildlife habitat, riparian areas, steep slopes, and areas supporting unique or rare plant communities are all potentially eligible for inclusion in this tax incentive program.

SMP Policy: Provide incentives for new development and for public and private shoreline owners to restore and enhance shoreline ecological functions and protect habitat for fish, wildlife and plants.

TDR / PRD Programs. The County has initiated Transfer of Development Rights and Purchase of Development Rights programs. These programs are primarily designed to preserve agricultural lands for long-term agricultural production.

Preservation of prime agricultural lands in the County ensures that development potential and adverse impacts to natural

SMP Policy: The county shall promote innovative land use techniques, where appropriate, such as transfer and purchase of development rights and other incentives for voluntary practices.

⁹ Adopted policies and designation criteria for participation in the County's tax incentive program are found in SCC 4.28.030 and .040 respectively.

floodplain processes in the major river valleys are minimized in these areas. Development potential is transferred to receiving areas which can support the increased density. Criteria for determining appropriate receiving areas includes planned densities, service availability and environmental constraints posed by natural features like slopes and soils, or the presence of streams and wetlands.

Purchase and Acquisition

Resource Land Conservation – Snohomish County has taken the lead in resource protection for the past 30 years by purchasing over 9,000 acres of parklands. The past and current comprehensive park plans highlight the need and importance of preserving key natural areas for the benefit of future generations. As a result there are many county parklands that are undeveloped sensitive environmental areas, and many with important natural areas (2007 Snohomish County Comprehensive Parks Plan). Some of the most important properties acquired with potential for preservation and restoration of natural areas include waterfront areas in Robe Canyon, Snohomish Estuary, Lord Hill Park, Bob Heirman Wildlife Preserve, River Meadows, Cicero Ponds, Lake Cassidy, Kayak Point, and O'Reilly Acres.

SMP Policy: The county should develop acquisition and conservation easement programs directed at lands that have unique ecological values or cannot be protected by any other method.

The County also works with the Cascade Land Conservancy to promote long term protection through permanent conservation easements.

Monitoring and Adaptive Management

Restoration efforts are monitored on both a regional and a local level. At the regional level, each of the watershed groups representing the fourteen watershed chapters of the Puget Sound Salmon Recovery Plan develop three-year work programs. Each of the three-year work programs are updated annually to describe the watershed's accomplishments during the previous year, identify the current status of recovery actions, and to propose future actions in the next three years necessary to implement the Salmon Recovery Plan. These work programs are intended to provide a road map for policy and technical decision makers across the Puget Sound region on priorities for implementing the salmon recovery plan, inform and support funding requests, and establish a recovery trajectory within each watershed and the region. Each year, a regional technical and policy review of each watershed's three-year work plan update is conducted to evaluate the consistency of actions with the Recovery Plan, as well as to provide support at both the watershed and regional scale for implementation.

WRIA-based monitoring occurs on four levels:

- Are the recommendations in the plan being implemented?
- Are the restoration and enhancement projects being successfully implemented? (i.e., Are riparian plantings surviving? Have natural ecological functions been restored or replicated? Are the projects working as intended?)
- Are the expected outcomes being observed? (i.e., Has habitat area increased? Are fish numbers improving?)
- Are the plans on target, focusing on the right functions and habitat elements and in the right geographic areas to achieve the desired outcomes?

The main goal of WRIA planning is to achieve a *net gain* in salmon habitat and fish numbers. This goal goes a substantial step beyond the “no net loss” standard in both the Shoreline Management Act and the Growth Management Act. To achieve a net gain, restoration and enhancement efforts must more than offset the balance achieved by protection and mitigation alone.

At the local level the County has developed a monitoring program to assess the level of success achieving the “no net loss” standard for ecological functions. Ecological indicators will be monitored along with restoration projects, development activities and mitigation measures. If it is determined that ecological functions have diminished over time, an assessment will be made to determine the cause(s) and identify the appropriate action necessary to restore the ecological balance. The County will be looking for potential failed or inadequate mitigation, failure to fully implement the regulatory requirements, or regulations which do not achieve the required standard. The County may utilize enforcement, regulatory changes, increased capital restoration and acquisition efforts, and education and incentive programs.

Outline of Monitoring Program

The monitoring program, designed to detect ecological changes in a timely fashion, consists of three main components: (1) assessment of changes in land cover indicators using primarily remote sensing methods; (2) assessment of changes in shoreline conditions along major rivers and lakes; and (3) assessment of select ecological indicators through a “treatment” and “control” study design to evaluate the effectiveness of code provisions in protecting aquatic environments.

Proposed monitoring indicators were selected to track changes in critical area functions and values based on the following criteria summarized from Reid and Furniss (1998):

1. High sensitivity to changes.

2. Accurate and precise with a high signal-to-noise ratio¹⁰.
3. Comprehensive in representing a range of functions and values of concern.
4. Documented methodology and performance measures in the scientific literature.
5. Cost effective means to obtain results of high statistical power.

Table 7 summarizes the indicators selected to monitor trends in critical area functions and values based on these criteria. Indicators are categorized as related to wetlands, to the riparian portion of FWHCA, or to the aquatic portion of FWHCA. Table 7 also presents ecological functions associated with each critical area, performance criteria from the scientific literature, and monitoring plan components.

The adaptive management component, designed to provide greater certainty that the conservation goal will be achieved, will evaluate whether changes in indicators were related to the regulations for Wetlands and Fish & Wildlife Habitat Conservation Areas (FWHCA)¹¹ and whether modifications to regulations or other County programs are needed to prevent a net loss of ecological functions.

Table 7. Monitoring Program Ecological Indicators

Critical Areas	Ecological Functions	Indicators ¹	Performance Criteria			Source	Monitoring Plan Component
			Properly Functioning	At Risk	Degraded		
Wetlands	Fish and wildlife habitat; habitat for locally important and threatened species; runoff absorption, pollution assimilation, water quality maintenance, floodwater storage and attenuation; stream base-flow, groundwater	Wetland area by type (open water, emergent, scrub/shrub, forested)	>80% historic wetlands intact	50-80% historic wetlands intact	<50% historic wetlands intact	NOAA Pathways and Indicators, 1996	One
FWHCA – Riparian (including lakes and marine shorelines)	Fish and wildlife habitat; habitat for locally important and threatened species, large woody debris recruitment, nutrients, water quality maintenance, stream bank stabilization	% mature forest cover	None reported	None reported	None reported	None reported	One
		% young forest cover	None reported	None reported	None reported	None reported	One
		% total vegetation cover (mature evergreen, medium evergreen, deciduous, scrub-shrub)	>80% riparian reserves intact	70-80% riparian reserves intact	<70% riparian reserves intact	NOAA Pathways and Indicators, 1996	One
		% total impervious area (TIA) ²	<7% TIA	7-12% TIA	>12% TIA	Summary of reports referenced in Spence <i>et al.</i> , 1996	One
FWHCA – Aquatic	Fish and wildlife habitat; habitat for locally important and threatened species,	% bank modifications	Bank hardening <10% of shorelines	Bank hardening 10-20% of shorelines	Bank hardening >20% of shorelines	NOAA Stormwater Matrix, 2003	Two

¹⁰ Signal-to-noise ratio is the ratio of relevant or useful information (signal) to irrelevant information (noise).

¹¹ Fish and Wildlife Habitat Conservation areas include: streams, lakes, marine waters and primary association areas for critical species [SCC 30.62A.010].

refugia in side-channels; large woody debris (LWD) and small woody debris; sediment storage and transport; water conveyance; clean water, nutrients	Bankfull channel width (CW) :depth ratio	<10	10-12	>12	NOAA Pathways and Indicators, 1996	Three
	Pool frequency	<u>CW pool/mile</u> 5' 184 10' 96 15' 70 20' 56 25' 47 50' 26 75' 23 100' 18 Meets pools standards above and also has opportunity for LWD recruitment	<u>CW pool/mile</u> 5' 184 10' 96 15' 70 20' 56 25' 47 50' 26 75' 23 100' 18 Meets pool standards but lacks opportunity for adequate LWD recruitment	<u>CW pool/mile</u> 5' 184 10' 96 15' 70 20' 56 25' 47 50' 26 75' 23 100' 18 Does not meet pool standards and lacks opportunity for adequate LWD recruitment	NOAA Pathways and Indicators, 1996	Three
	Temperature	<14 C	14-17 C	>17 C	EPA, 2003	Three
	Conductivity	<100 umhos/cm	100-200 umhos/cm	>200 umhos/cm	Snohomish County, 2000	Three
	Benthic Index of Biological Integrity	Index of 38-50	Index of 28-37	Index of 10-27	Karr, 1998	Three

This list of monitoring indicators represents the County's preferred approach at the time of publication of the monitoring program. Refinement of the study design through peer review continues. The County may refine the list as needed to remain consistent with BAS and program goals as part of the adaptive management process. For example, the County will evaluate the use of indices of riparian and wetland functions that combine multiple indicators such as riparian width, tree height, invasive species and connectivity. An advantage of indices is that they provide a framework for summarizing a broader range of functions and values into one result, and they tend to have a normal distribution, thus making statistical analysis more straightforward. A disadvantage is that they can mask downward trends in individual indicators. These issues will be explored further through discussions with regional experts in monitoring and statistics.

A description of each indicator and rationale for its selection is provided in more detail in the monitoring program document. Please refer to the Snohomish County's Best Available Science document for additional information on functions and values associated with each indicator (Revised Draft Summary of Best Available Science for Critical Areas, March 2006).

VI. Timelines, Priorities and Funding

Surface Water Management (SWM) is responsible for systematically identifying, securing funding, designing, and constructing projects that provide regionally important watershed scale improvements to water quality and habitat improvements.

The funding and timing with respect to design and construction of proposed restoration projects is described in the SWM Annual Construction Plan (ACP) and the Six-Year Capital Improvement Plan. Projects and timing included in these plans are described below. The Snohomish County Council has final budget approval over implementation of proposed restoration projects. Implementation of the restoration projects follows as clearly as possible the priorities in the restoration plans, with some modifications depending on available funding, willingness of landowners, or other issues. Other funding sources include community-based restoration funds through NOAA, grants through FCAAP, SRF, Pacific Coast Salmon Recovery Fund and other grants to supplement local funding. A Washington Conservation Corps crew is also shared with the Nature Conservancy. Additional funding sources are identified Appendix B. Implementation will continue to require significant financial assistance in the form of state and federal grants, in addition to county funding.

SMP Policy: The county shall aggressively seek funding from state, federal, private and other sources to implement restoration, enhancement, and acquisition projects.

The Surface Water Management Division of the Public Works Department has the responsibility of implementing restoration projects identified or recommended in watershed management plans, Drainage Needs Reports, and salmon conservation plans, with the goal of improving conditions for salmon habitat and recovery. The SWM Habitat and Rivers CIP – 2008 Annual Construction Plan includes restoration projects and plans that are funded and scheduled in 2008 for implementation, design, and construction.

Establishing Priorities and Benchmarks

The stability of funding sources and the continued participation of partners is instrumental in determining which projects remain on the list from year to year and progress through the incremental stages of implementation. Projects are funded from specific fund sources. If funding is no longer available to complete all the projects identified on the CIP, projects will be removed from the list based on which fund sources have been reduced or eliminated. Because of restrictions on the types of projects that can be funded by a specific fund source, funds cannot usually be transferred between projects. If a specific funding source disappears the projects relying on those funds will not get completed no matter how high the priority may be from an ecological standpoint.

Ecological priorities are established at the watershed level on a ten year timeframe as part of the WRIA planning efforts. This regional planning effort includes ecological

restoration in shoreline jurisdictional areas as integral to the larger watershed systems. The WRIA plans establish restoration goals, identify subbasin needs and priorities and establish criteria for evaluating restoration projects (see pages 22-26). From each WRIA plan is developed a three-year work program evaluating projects and determining benchmarks as incremental steps to achieving the 10-year WRIA plans. The three year plans are updated annually to keep track of progress and update the project lists, work schedules, partnerships and funding sources. Funding sources are identified and procured to implement specific projects or to fund a specific aspect common to several projects. These projects, or sub-projects then make it onto the six-year capital improvement program referred to as the Detailed Improvement Program.

The SWM Habitat and Rivers CIP Group revises the Detailed Improvement Program each year, adding or dropping projects based on funding opportunities, grants, and prioritization and input of new projects from existing planning efforts. Table 8 provides the project name and brief description of restoration projects and programs included in the SWM Habitat and Rivers CIP – 2008 Annual Construction Plan. Map id# corresponds to the restoration projects shown in Table 5 and Map 12.

Table 9 identifies potential additional funding sources for restoration planning and capital projects.

Table 8. Restoration Six-Year Capital Improvement Plan 2008 - 2013

Map 12 ID #	Project ID	Project Name	2008	2009	2010	2011	2012	2013	Total
20, 34	113new1	Lake Stevens DNR Habitat Projects	\$ 53,074	\$ 200,000	\$ 200,000	\$ 200,000	\$ 50,000	\$ 110,000	\$ 913,074
	DIP024	MDP Habitat Restoration Implementation	\$ -	\$ 100,000	\$ 100,000	\$ 100,000	\$ 100,000	\$ 100,000	\$ 500,000
67	DIP025	Salmon Restoration - Snohomish	\$ -	\$ 350,000	\$ 350,000	\$ 350,000	\$ 350,000	\$ 350,000	\$ 1,750,000
68	DIP026	Salmon Restoration - Stillaguamish	\$ -	\$ 350,000	\$ 350,000	\$ 350,000	\$ 350,000	\$ 350,000	\$ 1,750,000
69	DIP030	Mill Crk/Tambark DNR Habitat Implementation	\$ -	\$ 100,000	\$ 100,000	\$ 100,000	\$ 100,000	\$ 100,000	\$ 500,000
70	DIP031	Fish Passage - Snohomish	\$ -	\$ 150,000	\$ 150,000	\$ 150,000	\$ 150,000	\$ 150,000	\$ 750,000
	E131	Habitat Projects Database	\$ 20,000	\$ 20,000	\$ 15,000	\$ 15,000	\$ 15,000	\$ 15,000	\$ 100,000
27	E133	Big Four Culverts - Stilly	\$ 57,574	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 157,574
8	J11301	Pilchuck Barrier Inventory	\$ 4,753	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 24,753
5	J11302	Design Steward Projects	\$ 1,496	\$ 20,557	\$ 20,557	\$ 20,557	\$ 20,557	\$ 20,557	\$ 124,281
31	J11303	Brightwater Habitat Mitigation*	\$7,030,240	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 7,030,240
32	J11304	Brightwater Culverts	\$ 83,150	\$ 240,000	\$ 240,000	\$ 240,000	\$ 50,000	\$ -	\$ 953,150
47	J11305	Mosher Creek Restoration	\$ 9,896	\$ 9,904	\$ -	\$ -	\$ -	\$ -	\$ 19,800
	J11306	WMA Property Management	\$ -	\$ 40,000	\$ 40,000	\$ 40,000	\$ 40,000	\$ 40,000	\$ 200,000
	J11307	Project Monitoring and Maintenance	\$ 75,554	\$ 79,652	\$ 60,000	\$ 60,000	\$ 60,000	\$ 60,000	\$ 395,206
	WA354	CIP Program Management	\$ 30,878	\$ 27,882	\$ 27,882	\$ 27,882	\$ 27,882	\$ 27,882	\$ 170,288
4	WA358	Stilly Fish Passage Culverts	\$ -	\$ 100,000	\$ 100,000	\$ 100,000	\$ 100,000	\$ 100,000	\$ 500,000
11	WA359	South County Fish Passage Culverts	\$ -	\$ -	\$ -	\$ -	\$ 100,000	\$ 100,000	\$ 200,000
	WA361	Preliminary Design & 6 Yr Plan Development	\$ 96,375	\$ 96,430	\$ 96,430	\$ 96,430	\$ 96,430	\$ 96,430	\$ 578,525
	WA362	Native Plant Restoration Projects	\$ 69,641	\$ 86,649	\$ 86,649	\$ 86,649	\$ 86,649	\$ 86,649	\$ 502,886
13	WA365	Snohomish Fish Blockage Culvert	\$ 129,371	\$ 150,000	\$ 150,000	\$ 150,000	\$ 150,000	\$ 150,000	\$ 879,371
14	WA369	Creswell Cr Culverts/Channels	\$ 18,585	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 18,585
71	WA381	Alpine Rockeries Little Bear Crk	\$ 19,323	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 19,323
30	WA391	So. County Brightwater Culvert - Fisher Pond	\$ 113,108	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 113,108
	WA399	Admin. & OH, Stream Enhancement CIP	\$ 173,172	\$ 199,904	\$ 199,904	\$ 199,904	\$ 199,904	\$ 199,904	\$ 1,172,692
21	WA5XX	Stilly North Fork Big Trees	\$ 97,611	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 97,611
3	WA5XY	Stillaguamish Big Trees	\$ 99,725	\$ 90,663	\$ 87,000	\$ -	\$ -	\$ -	\$ 277,388
	WA7220	Beaver Management	\$ 65,018	\$ 65,308	\$ 65,038	\$ 65,038	\$ 65,038	\$ 65,038	\$ 390,478
46	WA8560	Lundeen Creek (LS UGA) CIDI	\$ 187,657	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 187,657
2	WA8561	North Creek School (Tambark DNR & Grant)	\$ 124,321	\$ 100,000	\$ -	\$ -	\$ -	\$ -	\$ 224,321
72	WA539	Stillaguamish Discretionary Fund Projects	\$ 34,994	\$ 47,500	\$ 47,500	\$ 47,500	\$ 47,500	\$ 47,500	\$ 272,494
22	E1322	Shingleboat Slough	\$ 43,993	\$ 300,000	\$ -	\$ -	\$ -	\$ -	\$ 343,993
39	E1323	Braided Reach - Phase II	\$ 75,840	\$ 300,000	\$ -	\$ -	\$ -	\$ -	\$ 375,840

73	E1324	Snohomish Estuary Mainstem Connectivity	\$ 92,163	\$ 100,000	\$ -	\$ -	\$ -	\$ -	\$ 192,163
23	E1325	Stilly South Fork ELJ Siting and Design	\$ 80,000	\$ 150,000	\$ -	\$ -	\$ -	\$ -	\$ 230,000
	E1326	Ebey Slough/ Everett Dike Reconfig.	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
25	E1327	Prop. Mgmt Skyview	\$ 45,000	\$ 45,000	\$ -	\$ -	\$ -	\$ -	\$ 90,000
16	New 132	Lower Skykomish Reach Analysis	\$ 19,036	\$ 50,000	\$ 220,000	\$ 50,000	\$ -	\$ -	\$ 339,036
	WA7215	Restoration Materials	\$ 117,125	\$ 120,000	\$ 120,000	\$ 120,000	\$ 120,000	\$ 120,000	\$ 717,125
	WA7226	River Project Feasibility & Preliminary Design	\$ 116,619	\$ 150,000	\$ 150,000	\$ 150,000	\$ 150,000	\$ 150,000	\$ 866,619
48	WA9202	Corps - North Meander (Lower Mainstem Stilly)	\$ 66,343	\$ 40,000	\$ 35,000	\$ 30,000	\$ 25,000	\$ 15,000	\$ 211,343
1	WA9206	Snohomish Estuary Tidal Marsh (Smith Island)	\$ 206,676	\$ 175,000	\$4,000,000	\$4,000,000	\$ 200,000	\$ 100,000	\$ 8,681,676
	WA9212	Riparian Improvements	\$ 39,240	\$ 50,000	\$ 50,000	\$ 50,000	\$ 50,000	\$ 50,000	\$ 289,240
17	WA9218	Braided Reach Design	\$ 115,804	\$ 107,078	\$ 100,000	\$ -	\$ -	\$ -	\$ 322,882
18	WA9219	Snohomish Confluence Restoration Grant	\$ 79,936	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 79,936
19	WA9222	Snohomish Estuary Edge Enhancements	\$ 112,946	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 112,946
49	WA9224	South Meander (Lower Stilly Mainstem)	\$ 186,530	\$1,000,000	\$ 250,000	\$ 15,000	\$ 10,000	\$ 10,000	\$ 1,471,530
	WA9225	CIP Salmon Plan Implementation	\$ 38,013	\$ 50,000	\$ 50,000	\$ 50,000	\$ 50,000	\$ 50,000	\$ 288,013
	WA9226	Monitoring - Restoration Project Establishment	\$ 9,197	\$ 50,000	\$ 50,000	\$ 50,000	\$ 50,000	\$ 50,000	\$ 259,197
	WA9299	Admin. & OH, Major River CIP	\$ 76,439	\$ 50,000	\$ 50,000	\$ 50,000	\$ 50,000	\$ 50,000	\$ 326,439
		Clean Water/Healthy Streams ACP Total	\$10,456,416	\$5,361,527	\$7,560,960	\$6,963,960	\$2,863,960	\$2,763,960	\$ 35,970,783
74	SEP1	Estuary Restoration Construction Seed	\$ 25,130	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 25,130
75	SEP2	Develop Partnerships	\$ 17,295	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 17,295
		Snohomish Estuary Partnership ACP Total	\$ 42,425	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 42,425
42	CEIA	Com. Enhancement Init. - Flood Fencing	\$ 183,887	\$ 238,078	\$ 238,078	\$ 238,078	\$ -	\$ -	\$ 898,121
		Community Enhancement Initiative ACP Total	\$ 183,887	\$ 238,078	\$ 238,078	\$ 238,078	\$ -	\$ -	\$ 898,121
		Surface Water & River Management Grand Total	\$10,682,728	\$5,599,605	\$7,799,038	\$7,202,038	\$2,863,960	\$2,763,960	\$ 36,911,329

* Brightwater mitigation includes property acquisition, headwater habitat restoration, fen restoration and fish passage projects.

Table 9. Potential Funding Groups for Shoreline Restoration

Funding Group	Funding Category	Eligibility	Deadline	Contact	Restoration Goal	Opportunity Type
National Fish and Wildlife Foundation	Conserve fish, wildlife, plant habitats	Local governments, WA State	June 1/Oct 15	Suzanne Piluso 503-417-8700 Suzanne.piluso@nfwf.org	Preserve and Restore Habitat Functions	Habitat
Water Quality - DOE	Water quality, wastewater treatment source, wetland habitat preservation funding, public education	Local governments, recognized tribes	Feb 3	Jeff Nejedly 360-407-6566	Protect and Improve Water Quality	Wetlands
Flood Control - DOE	Fish habitat protection, enhancement	Cities	Feb 1	Bev Huether bhue461@ecy.wa.gov	Reduce Impacts of Flooding Events	Flooding Habitat
Community Salmon Fund - King County NFWF	Fund habitation protection and restoration to benefit watershed health	Local governments, WA State, South Snohomish Co.	Aug 15/Sept 15	Nick Pearson 206-691-0700 npearson@evergreenfc.com	Preserve and Restore Habitat Functions	Habitat
National Fire Plan	Reduce fuels on lands at risk	Cities	Feb 11	Lauren Maloney 503-808-6587 lauren_maloney@or.blm.gov	Preserve Natural areas and Vegetation	Vegetation
F&W Species of Concern	Land acquisition, habitat conservation, to conserve threatened and endangered species		Dec 17	Joanne Stellini joanne_stellini@fws.gov	Preserve and Restore Habitat Functions	Habitat
Cooperative Endangered Species Fund	Conserve threatened or endangered species, protect lands for habitat conservation	Not for habitat restoration or enhancement	March 31	Elizabeth Rodrick 360-902-2696 Brad Pruitt 360-902-1102	Preserve Natural Areas and Vegetation	Vegetation
National Resource Conservation Service	Wetlands easements and restoration	Landowners, tribes	No date listed	Leslie Deavers, USDA 202-720-1067	Protect and Improve Water Quality	Wetlands
Assessment and Watershed Protection Grants - EPA	Erosion and sediment control management	Local governments, WA State	June 21	Katie Flahive 202-566-1206 flahive.katie@epa.gov	Protect and Improve Water quality	Floodplain Flooding
Aquatic Lands Enhancement Account - DNR				Leslie Ryan Phone: (360) 902-1064 Email: leslie.ryan@wadnr.gov	Reduce Impacts of Flooding Events	Flooding
Bring Back the Natives - National Fish and Wildlife Foundation				Pam McClelland Phone: (202) 857-0166 Email: mcclelland@nfwf.org	Preserve Natural Areas and Vegetation	Habitat Vegetation
Landowner incentive program - Washington State Department of Fish and Wildlife, Lands Division				Ginna Correa or Jeff Skriletz Phone: (360) 902-2478 or (360) 902-8313 http://wdfw.wa.gov/lands/lip	Preserve and Improve Physical and Visual Public Access to the Shoreline	Habitat Vegetation
Regional Fisheries Enhancement Groups - Washington				Kristi Lynett Phone: (360) 902-2237 Email: lynetsl@dfw.wa.gov	Preserve and Restore Habitat Functions	Habitat

State Department of Fish and Wildlife						
Salmon Recovery Funding Board - Interagency Committee for Outdoor Recreation				Rollie Geppert Phone: (360) 902-2636 Email: Salmon@iac.wa.gov	Preserve and Restore Habitat Functions	Habitat
Conservation Futures Fund				Snohomish County Parks and Recreation 425-388-6600		Vegetation Habitats
Snohomish Conservation District	Conservation Reserve Enhancement Program (CREP)			Jamie Bails Phone: 425-335-5634 ext. 106 Email: jaimeb@snohomishcd.org	Conservation Easements	Vegetation Habitat
Wetland Protection, Restoration, and Stewardship Discretionary Funding - Environmental Protection Agency				Christina Miller Phone: (206) 553-6512 Email: miller.christina@epa.gov	Protect and Improve Water Quality	Vegetation Habitat

VII. Maps 1 - 12

The following maps show which portions (or planning segments) of the County's rivers, lakes and marine shoreline would benefit from restoration activities. These planning segments are also represented on the data tables in Appendix A.

Map 1 identifies the planning segments and implies that all shorelines in the county would benefit from public education and assistance programs. Increasing public awareness of shoreline ecology and measures to protect the natural shoreline functions would benefit all shorelines.

Map 1 – Planning Segments and Restoration Opportunities RO-I (Education and Public Assistance Programs)

Map 2 – Restoration Opportunities RO-II (Riparian Restoration)

Map 3 - Restoration Opportunities RO-III (Protect and Restore Estuaries)

Map 4 - Restoration Opportunities RO-IV (Add Large Woody Debris)

Map 5 - Restoration Opportunities RO-V (Restore Channel and Floodplain Functions)

Map 6 - Restoration Opportunities RO-VI (Protect and Restore Sediment Process)

Map 7 - Restoration Opportunities RO-VII (Restore Fish Passage)

Map 8 - Restoration Opportunities RO-VIII (Protect and Restore Wetlands)

Map 9 - Restoration Opportunities RO-IX (Acquire and Remove Shoreline Structures)

Map 10 - Restoration Opportunities RO-X (Protect Existing Habitat)

Map 11 - Restoration Opportunities RO-XI (Invasive Weed Control)

Map 12 – Capital Improvement Restoration Projects (companion to Tables 5 and 8)

Appendix A: Restoration Needs & Opportunities by Shoreline Planning Segment (Data Table)

The following table contains the data used to produce Maps 2 – 11.

The column headings mean:

MAR_REAC_1 indicates the major associated drainage as follows:

- 0 = either lake or marine shoreline segment
- 20 = Stillaguamish mainstem
- 21 = Stillaguamish, North Fork
- 22 = Stillaguamish, South Fork
- 30 = Snohomish River
- 40 = Skykomish River
- 50 = Snoqualmie River
- 60 = Skagit / Sauk Rivers
- 70 = Lake Washington

REACH_NAME is the assigned planning segment name from the shoreline inventory.

REACH_TYPE indicates whether the planning segment is located along a lake, river or marine shoreline.

RO-I through RO-XI indicates the twelve restoration opportunities defined in Table 3. If the cell contains a “1”, the corresponding restoration opportunity has been identified as a need for the planning segment.

Highlighted rows indicate planning segments outside of the County’s jurisdiction and located within cities or on tribal or federal lands.

MAR_REAC_1	REACH_NAME	REACH_TYPE	RO-I	RO-II	RO-III	RO-IV	RO-V	RO-VI	RO-VII	RO-VIII	RO-IX	RO-X	RO-XI
0	Armstrong1	lake	1	1	0	0	1	0	0	1	0	0	0
0	Armstrong2	lake	1	0	0	0	0	0	0	0	0	1	0
0	Armstrong3	lake	1	0	0	0	0	0	0	0	0	1	0
0	Ballinger1	lake											
0	Ballinger2	lake											
0	Blackman1	lake											
0	Blackman2	lake											
0	Blanca1	lake											
0	Boardmaneast1	lake	1	0	0	0	0	0	0	0	0	1	0
0	Bosworth1	lake	1	1	0	0	0	0	0	0	0	0	0
0	Bosworth2	lake	1	1	0	0	0	0	0	0	0	0	0
0	Boulder1	lake	1	0	0	0	0	0	0	0	0	1	0
0	Bryant1	lake	1	0	0	0	0	0	0	0	0	1	0
0	Cassidy1	lake	1	0	0	0	0	0	0	0	0	1	0
0	Cassidy2	lake	1	0	0	0	0	0	0	1	0	1	0
0	Chain1	lake	1	0	0	0	0	0	0	0	0	1	0
0	Chaplain1	lake											
0	Chaplain2	lake											
0	Cochran1	lake	1	1	0	0	0	0	0	0	0	1	0
0	Cochran2	lake	1	1	0	0	0	0	0	0	0	0	0
0	Connor1	lake	1	0	0	0	0	0	0	0	0	1	0
0	Copper1	lake	1	0	0	0	0	0	0	0	0	1	0
0	Crabapple1	lake	1	1	0	0	0	0	0	0	0	0	0
0	Crabapple2	lake	1	1	0	0	0	0	0	0	0	1	0
0	Crabapple3	lake	1	1	0	0	0	0	0	0	0	0	0
0	Crabapple4	lake	1	0	0	0	0	0	0	0	0	1	0
0	Crystal1	lake	1	0	0	0	0	0	0	1	0	1	0
0	Crystal2	lake	1	1	0	0	0	0	1	0	0	0	0
0	Dagger1	lake	1	0	0	0	0	0	0	0	0	1	0
0	Echo1	lake	1	0	0	0	0	0	0	0	0	1	0
0	Flowing1	lake	1	1	0	0	0	0	0	0	0	0	0
0	Flowing2	lake	1	1	0	0	0	0	0	0	0	0	0
0	Flowing3	lake	1	1	0	0	0	0	0	0	0	0	0
0	Flowing4	lake	1	1	0	0	0	0	0	0	0	0	0
0	Fontal1	lake	1	1	0	0	0	0	0	0	0	0	0

0	Getchell1	lake	1	0	0	0	0	0	0	0	0	1	0
0	Gisberg1	lake											
0	Goodwin1	lake	1	1	0	0	0	0	0	0	0	0	0
0	Goodwin2	lake	1	1	0	0	0	0	0	0	0	0	0
0	Goodwin3	lake	1	1	0	0	0	0	0	0	0	0	0
0	Goodwin4	lake	1	1	0	0	0	0	0	0	0	0	0
0	Goodwin5	lake	1	1	0	0	0	0	0	0	0	0	0
0	Goodwin6	lake	1	1	0	0	0	0	0	0	0	0	0
0	Goodwin7	lake	1	1	0	0	0	0	0	0	0	0	0
0	Goodwin8	lake	1	1	0	0	0	0	0	0	0	0	0
0	Griederbig1	lake	1	0	0	0	0	0	0	0	0	1	0
0	Griederlittle1	lake	1	0	0	0	0	0	0	0	0	1	0
0	Hannan1	lake	1	0	0	0	0	0	0	0	0	1	0
0	Howard1	lake	1	0	0	0	0	0	0	0	0	1	0
0	Howard2	lake	1	1	0	0	0	0	0	0	0	0	0
0	Hughes1	lake	1	0	0	0	0	0	0	0	0	1	0
0	Johnsam1	lake	1	1	0	0	0	0	0	1	0	0	0
0	Johnsam2	lake											
0	Kellog1	lake	1	0	0	0	0	0	0	1	0	1	0
0	Ketchum1	lake	1	1	0	0	0	0	0	0	0	0	0
0	Ketchum2	lake	1	1	0	0	0	0	0	1	0	0	0
0	Ki1	lake	1	1	0	0	0	0	0	0	0	0	0
0	Ki2	lake	1	1	0	0	0	0	0	0	0	0	0
0	Ki3	lake	1	1	0	0	0	0	0	0	0	0	0
0	Little1	lake	1	0	0	0	0	0	0	0	0	1	0
0	Loma1	lake	1	1	0	0	0	0	0	0	0	0	0
0	Loma2	lake	1	0	0	0	0	0	0	0	0	1	0
0	MarthaNorth1	lake	1	0	0	0	0	0	0	0	0	1	0
0	MarthaNorth2	lake	1	1	0	0	0	0	0	0	0	0	0
0	MarthaS1	lake	1	1	0	0	0	0	0	0	0	0	0
0	MarthaS2	lake	1	1	0	0	0	0	0	0	0	0	0
0	MarthaS3	lake	1	1	0	0	0	0	0	0	0	0	0
0	Mud1	lake	1	0	0	0	0	0	0	0	0	1	0
0	Monroe1	lake											
0	Panther1	lake	1	1	0	0	0	0	0	0	0	1	0
0	Panther2	lake	1	0	0	0	0	0	0	0	0	1	0
0	Panther3	lake	1	1	0	0	0	0	0	0	0	0	0

0	Purdy1	lake	1	0	0	0	0	0	0	0	0	1	0
0	Riley1	lake	1	1	0	0	0	0	0	0	0	1	0
0	Riley2	lake	1	0	0	0	0	0	0	0	0	1	0
0	Roesiger1	lake	1	1	0	0	0	0	0	0	0	0	0
0	Roesiger10	lake	1	1	0	0	0	0	0	0	0	0	0
0	Roesiger11	lake	1	1	0	0	0	0	0	0	0	0	0
0	Roesiger2	lake	1	1	0	0	0	0	0	0	0	0	0
0	Roesiger3	lake	1	1	0	0	0	0	0	0	0	0	0
0	Roesiger4	lake	1	1	0	0	0	0	0	0	0	0	0
0	Roesiger5	lake	1	1	0	0	0	0	0	0	0	0	0
0	Roesiger6	lake	1	1	0	0	0	0	0	0	0	1	0
0	Roesiger7	lake	1	1	0	0	0	0	0	0	0	0	0
0	Roesiger8	lake	1	1	0	0	0	0	0	0	0	0	0
0	Roesiger9	lake	1	1	0	0	0	0	0	0	0	0	0
0	Serene1	lake	1	1	0	0	0	0	0	0	0	0	0
0	Shoecraft1	lake	1	1	0	0	0	0	0	0	0	0	0
0	Shoecraft2	lake	1	1	0	0	0	0	0	0	0	0	0
0	Shoecraft3	lake	1	1	0	0	0	0	0	0	0	0	0
0	Shoecraft4	lake	1	1	0	0	0	0	0	0	0	0	0
0	Shoecraft5	lake	1	1	0	0	0	0	0	0	0	0	0
0	Shoecraft6	lake	1	1	0	0	0	0	0	0	0	0	0
0	Spada1	lake	1	0	0	0	0	0	0	0	0	1	0
0	Spada2	lake	1	0	0	0	0	0	0	0	0	1	0
0	Spada3	lake	1	0	0	0	0	0	0	0	0	1	0
0	Spada4	lake	1	0	0	0	0	0	0	0	0	1	0
0	Spada5	lake	1	0	0	0	0	0	0	0	0	1	0
0	Spada6	lake	1	0	0	0	0	0	0	0	0	1	0
0	Spring1	lake	1	0	0	0	0	0	0	0	0	1	0
0	Stevens1	lake	1	1	0	0	0	0	0	1	0	0	0
0	Stevens2	lake	1	1	0	0	0	0	0	1	0	0	0
0	Stevens3	lake	1	1	0	0	0	0	0	1	0	0	0
0	Stevens4	lake	1	1	0	0	0	0	0	1	0	0	0
0	Stevens5	lake	1	1	0	0	0	0	0	1	0	0	0
0	Stevens6	lake	1	1	0	0	0	0	0	1	0	0	0
0	Stevens7	lake	1	1	0	0	0	0	0	1	0	0	0
0	Stickney1	lake	1	0	0	0	0	0	0	1	0	1	0
0	Stickney2	lake	1	1	0	0	0	0	0	1	0	0	0

0	Storm1	lake	1	0	0	0	0	0	0	0	0	1	0
0	Storm2	lake	1	1	0	0	0	0	0	0	0	0	0
0	Storm3	lake	1	1	0	0	0	0	0	0	0	0	0
0	Sunday1	lake	1	1	0	0	0	0	0	0	0	0	0
0	Sunday2	lake	1	1	0	0	0	0	0	0	0	0	0
0	Sunset1	lake											
0	Swartz1	lake	1	0	0	0	0	0	0	0	0	0	1
0	Swartz2	lake	1	0	0	0	0	0	0	0	0	1	1
0	Thomas1	lake	1	0	0	0	0	0	0	0	0	1	0
0	Tomtit1	lake	1	0	0	0	0	0	0	0	0	1	0
0	TwinLakes1	lake	1	0	0	0	0	1	0	1	0	0	0
0	TwinLakes2	lake	1	0	0	0	0	1	0	1	0	0	0
0	Wagner1	lake	1	1	0	0	0	0	0	0	0	1	0
0	Wallace1	lake	1	0	0	0	0	0	0	0	0	1	0
0	Weallup1	lake											
0	Woods1	lake	1	0	0	0	0	0	0	0	0	1	0
0	_armstrong	lake_center	1	0	0	0	0	0	0	0	0	0	0
0	_ballinger	lake_center	1	0	0	0	0	0	0	0	0	0	0
0	_biggeiger	lake_center	1	0	0	0	0	0	0	0	0	0	0
0	_blackmans	lake_center	1	0	0	0	0	0	0	0	0	0	0
0	_blanca	lake_center	1	0	0	0	0	0	0	0	0	0	0
0	_bosworth	lake_center	1	0	0	0	0	0	0	0	0	0	0
0	_boulder	lake_center	1	0	0	0	0	0	0	0	0	0	0
0	_bryant	lake_center	1	0	0	0	0	0	0	0	0	0	0
0	_cassidy	lake_center	1	0	0	0	0	0	0	0	0	0	1
0	_chain	lake_center	1	0	0	0	0	0	0	0	0	0	0
0	_chaplain	lake_center	1	0	0	0	0	0	0	0	0	0	0
0	_cochran	lake_center	1	0	0	0	0	0	0	0	0	0	0
0	_conner	lake_center	1	0	0	0	0	0	0	0	0	0	0
0	_copper	lake_center	1	0	0	0	0	0	0	0	0	0	0
0	_crabapple	lake_center	1	0	0	0	0	0	0	0	0	0	0
0	_crystal	lake_center	1	0	0	0	0	0	0	0	0	0	0
0	_dagger	lake_center	1	0	0	0	0	0	0	0	0	0	0
0	_eastboardman	lake_center	1	0	0	0	0	0	0	0	0	0	0
0	_echo	lake_center	1	0	0	0	0	0	0	0	0	0	1
0	_echo2	lake_center	1	0	0	0	0	0	0	0	0	0	0
0	_MonroePond	lake_center	1	0	0	0	0	0	0	0	0	0	0

0	_flowing	lake_center	1	0	0	0	0	0	0	0	0	0	0
0	_flowing2	lake_center	1	0	0	0	0	0	0	0	0	0	0
0	_fontal	lake_center	1	0	0	0	0	0	0	0	0	0	0
0	_getchell	lake_center	1	0	0	0	0	0	0	0	0	0	0
0	_gisberg	lake_center	1	0	0	0	0	0	0	0	0	0	0
0	_goodwin	lake_center	1	0	0	0	0	0	0	0	0	0	1
0	_hannan	lake_center	1	0	0	0	0	0	0	0	0	0	0
0	_howard	lake_center	1	0	0	0	0	0	0	0	0	0	0
0	_hughes	lake_center	1	0	0	0	0	0	0	0	0	0	0
0	_johnsam	lake_center	1	0	0	0	0	0	0	0	0	0	0
0	_kellog	lake_center	1	0	0	0	0	0	0	0	0	0	0
0	_ketchum	lake_center	1	0	0	0	0	0	0	0	0	0	1
0	_ki	lake_center	1	0	0	0	0	0	0	0	0	0	0
0	_lakemartha	lake_center	1	0	0	0	0	0	0	0	0	0	0
0	_little	lake_center	1	0	0	0	0	0	0	0	0	0	0
0	_littlegrieder	lake_center	1	0	0	0	0	0	0	0	0	0	0
0	_littlegrieder2	lake_center	1	0	0	0	0	0	0	0	0	0	0
0	_loma	lake_center	1	0	0	0	0	0	0	0	0	0	1
0	_marthasouth	lake_center	1	0	0	0	0	0	0	0	0	0	1
0	_mud	lake_center	1	0	0	0	0	0	0	0	0	0	0
0	_panther	lake_center	1	0	0	0	0	0	0	0	0	0	0
0	_purdy	lake_center	1	0	0	0	0	0	0	0	0	0	0
0	_riley	lake_center	1	0	0	0	0	0	0	0	0	0	0
0	_roesiger	lake_center	1	0	0	0	0	0	0	0	0	0	1
0	_serene	lake_center	1	0	0	0	0	0	0	0	0	0	1
0	_shoecraft	lake_center	1	0	0	0	0	0	0	0	0	0	1
0	_spada	lake_center	1	0	0	0	0	0	0	0	0	0	0
0	_spring	lake_center	1	0	0	0	0	0	0	0	0	0	0
0	_stevens	lake_center	1	0	0	0	0	0	0	0	0	0	0
0	_stickney	lake_center	1	0	0	0	0	0	0	0	0	0	0
0	_storm	lake_center	1	0	0	0	0	0	0	0	0	0	0
0	_sunday	lake_center	1	0	0	0	0	0	0	0	0	0	0
0	_sunset	lake_center	1	0	0	0	0	0	0	0	0	0	0
0	_swartz	lake_center	1	0	0	0	0	0	0	0	0	0	1
0	_thomas	lake_center	1	0	0	0	0	0	0	0	0	0	0
0	_tomtit	lake_center	1	0	0	0	0	0	0	0	0	0	0
0	_twinnorth	lake_center	1	0	0	0	0	0	0	0	0	0	0

0	_twinsouth	lake_center	1	0	0	0	0	0	0	0	0	0	0
0	_wagner	lake_center	1	0	0	0	0	0	0	0	0	0	0
0	_wallace	lake_center	1	0	0	0	0	0	0	0	0	0	0
0	_weallup	lake_center	1	0	0	0	0	0	0	0	0	0	0
0	_woods	lake_center	1	0	0	0	0	0	0	0	0	0	0
0	Can-1	marine	1	0	1	0	1	0	0	1	0	0	0
0	Can-2	marine	1	0	1	0	1	0	0	1	0	0	0
0	Edmonds-1	marine											
0	Edmonds-2	marine											
0	Hattelsland-1	marine	1	1	0	0	0	0	0	0	0	0	0
0	Hattelsland-2	marine	1	0	0	1	0	0	0	0	0	0	0
0	Hattelsland-3	marine	1	1	0	0	0	0	0	0	0	1	0
0	Hattelsland-4	marine	1	0	0	0	0	1	0	0	0	0	0
0	Hattelsland-5	marine	1	0	0	0	0	0	0	1	1	0	0
0	Hattelsland-6	marine	1	0	0	0	0	1	0	0	0	1	0
0	HattSlough-1	marine	1	0	0	0	1	0	0	1	0	0	0
0	HattSlough-2	marine	1	0	0	0	1	0	0	1	0	0	0
0	JettyIsland-1	marine											
0	PicnicPoint-1	marine	1	1	0	0	0	1	1	0	1	0	0
0	Pointwells-1	marine	1	1	0	0	0	0	0	1	1	0	0
0	Sn-1	marine											
0	Sn-1/Sn-2	marine											
0	Sn-2a	marine											
0	Sn-2b	marine											
0	Sn-2c	marine											
0	Sno-0/Sno-1a	marine	1	0	0	0	0	0	0	0	0	1	0
0	Sno-0/Sno-1b	marine	1	0	0	0	1	0	0	1	1	1	0
0	Sno-0/Sno-1c	marine	1	0	1	0	1	0	0	0	0	0	0
0	Sno-0/Sno-1d	marine											
0	Sno-1/Sno-2	marine	1	1	0	1	0	0	0	0	0	0	0
0	Sno-1b	marine	1	0	1	0	1	0	0	0	0	1	0
0	Sno-1c	marine	1	1	0	0	0	0	0	1	0	1	0
0	Sno-1d	marine	1	1	0	0	0	1	0	0	0	1	0
0	Sno-1e	marine	1	1	0	0	0	1	0	0	0	1	0
0	Sno-1f	marine	1	0	0	0	0	1	0	0	0	1	0
0	Sno-2/Sno-3	marine	0	1	1	0	0	0	0	1	0	0	0
0	Sno-3	marine	1	1	0	0	0	1	0	0	1	0	0

0	Sno-3/Sno-4	marine	1	1	0	0	0	1	0	1	1	0	0
0	Sno-4	marine	1	0	0	0	0	1	1	0	1	0	0
0	Stanwood-1m	marine	1	1	0	0	1	0	0	0	0	0	0
0	Stanwood-2m	marine	1	0	1	0	1	0	0	0	0	0	0
0	WarmBeach-1	marine	1	0	0	0	0	1	0	0	0	1	0
0	WarmBeach-2	marine	1	1	0	0	0	1	0	0	0	0	0
0	Woodway-1	marine											
20	Armstrong1-new	river	1	1	0	0	1	0	1	1	0	0	0
20	Armstrong2-new	river	1	1	0	0	0	0	0	0	0	1	0
20	Armstrong3-new	river	1	1	0	0	0	0	0	0	0	1	0
20	Church1-new	river	1	1	0	1	0	0	1	1	0	1	0
20	Church2-new	river	1	1	0	1	0	0	0	1	0	0	0
20	ChurchJorg-new	river	1	1	0	1	0	0	1	1	0	0	0
20	Hatt-1	river	1	1	0	0	0	0	0	1	0	0	0
20	Hatt-2	river	1	1	0	0	0	0	0	1	0	0	0
20	Mainstem-1	river	1	0	0	0	1	0	0	1	0	0	0
20	Mainstem-3	river	1	0	0	1	1	0	0	0	0	0	0
20	Mainstem-3A	river	1	1	0	0	1	0	0	0	0	0	0
20	Mainstem-4A	river	1	1	0	0	0	0	0	1	0	0	0
20	Mainstem-4B	river	1	1	0	0	0	0	0	0	0	1	0
20	OldStilly-1	river	1	1	0	0	1	0	0	1	0	0	0
20	PilchuckCreek-1	river	1	1	0	0	0	0	0	0	0	0	0
20	PilchuckCreek-2	river	1	0	0	0	0	0	0	0	0	1	0
20	PilchuckCreek-3	river	1	0	0	0	0	0	0	1	0	1	0
20	Portage-new	river	1	1	0	1	1	0	1	1	1	0	0
20	Stanwood-1	river	1	1	1	0	0	0	0	0	0	0	0
21	Boulder-1	river	1	1	0	0	0	1	0	0	0	1	0
21	Boulder-2	river	1	0	0	1	0	0	0	0	0	1	0
21	Brooks-new	river	1	0	0	0	0	1	0	0	0	1	0
21	DeerCreek-1	river	1	1	0	0	0	0	0	0	0	1	0
21	FrenchCr-1	river	1	0	0	0	0	0	0	0	0	1	0
21	Grant-new	river	1	1	0	1	1	1	1	0	0	1	0
21	Montague-1	river	1	0	0	0	0	0	0	0	0	1	0
21	NorthFork-1	river	1	0	0	0	0	0	0	0	0	1	0
21	NorthFork-2	river	1	0	0	1	1	0	0	0	0	0	0
21	NorthFork-3	river	1	0	0	1	1	0	0	1	0	0	0
21	NorthFork-4	river	1	1	0	1	1	1	0	1	0	0	0

21	NorthFork-5	river	1	1	0	1	1	0	0	0	0	0	0
21	NorthFork-6	river	1	1	0	0	1	0	0	1	0	1	0
21	NorthFork-7	river	1	1	0	1	0	0	0	0	0	1	0
21	NorthFork-8	river	1	1	0	0	0	0	0	0	0	1	0
21	NorthFork-9	river	1	1	0	0	0	0	0	0	0	1	0
21	Rollins-1	river	1	0	0	1	0	0	0	0	0	1	0
21	Rollins-new	river	1	0	0	1	0	0	0	0	0	1	0
21	Segelson-new	river	1	1	0	1	0	1	0	0	0	1	0
21	Squire-1	river	1	1	0	0	0	0	0	0	0	0	0
21	Squire-2	river	1	1	0	0	0	0	0	0	0	1	0
21	Squire-3	river	1	0	0	0	0	0	0	0	0	1	0
22	Black1-new	river	1	0	0	0	0	1	0	0	0	1	0
22	CanynUT1-new	river	1	1	0	0	0	1	0	0	0	1	0
22	CanynUT2-new	river	1	0	0	0	0	1	0	0	0	1	0
22	CanynUT3-new	river	1	1	0	1	0	0	1	0	0	0	0
22	CanynUT4-new	river	1	1	0	1	0	0	1	0	0	0	0
22	CanynUT5-new	river	1	1	0	1	0	1	0	1	0	1	0
22	CanynUT6-new	river	1	0	0	0	0	1	0	0	0	1	0
22	Canyon-1	river	1	0	0	0	0	0	0	0	0	1	0
22	Canyon-2A	river	1	1	0	0	0	1	0	0	0	0	0
22	Canyon-2B	river	1	0	0	0	0	1	0	0	0	1	0
22	Canyon-2C	river	1	1	0	0	0	1	0	0	0	0	0
22	Canyon-3	river	1	0	0	0	0	0	0	0	0	1	0
22	CanyonNF-new	river	1	0	0	0	0	1	0	0	0	1	0
22	Cranberry1-new	river	1	1	0	1	0	0	0	0	0	1	0
22	Cub1-new	river	1	0	0	0	0	1	0	1	0	1	0
22	Cub2-new	river	1	0	0	0	0	1	0	1	0	1	0
22	Deer1-new	river	1	0	0	0	0	1	0	0	0	1	0
22	Jim1-new	river	1	1	0	0	0	1	0	0	0	1	0
22	Jim1-new	river	1	1	0	0	0	1	0	0	0	1	0
22	Jim2-new	river	1	1	0	1	0	0	0	0	0	0	0
22	Jim3-new	river	1	0	0	0	0	0	0	0	0	1	0
22	Jim4-new	river	1	0	0	0	0	0	0	0	0	1	0
22	JimCreek-1	river	1	1	0	0	0	0	0	0	0	1	0
22	JimCreek-2	river	1	1	0	0	0	0	0	1	0	0	0
22	JimCreek-3	river	1	1	0	0	0	0	0	0	0	1	0
20	Jorgenson1-new	river	1	1	0	0	1	0	0	1	1	0	0

22	SouthFork-1A	river	1	1	0	1	1	0	0	0	0	0	0
22	SouthFork-1B	river	1	1	0	1	1	0	0	0	0	0	0
22	SouthFork-2	river	1	1	0	1	1	0	0	0	0	0	0
22	SouthFork-3A	river	1	1	0	1	1	0	0	0	0	0	0
22	SouthFork-3B	river	1	1	0	1	1	0	0	0	0	0	0
22	SouthFork-3C	river	1	1	0	1	1	0	0	0	0	0	0
22	SouthFork-4	river	1	0	0	0	0	0	0	0	0	1	0
22	SouthFork-5	river	1	0	0	0	0	0	0	0	0	1	0
22	SouthFork-6	river	1	0	0	0	0	0	0	0	0	1	0
22	SouthFork-7A	river	1	0	0	1	0	0	0	0	0	1	0
22	SouthFork-7B	river	1	0	0	0	0	1	0	0	0	1	0
22	SouthFork-7C	river	1	0	0	0	0	0	0	0	0	1	0
22	SouthFork-8	river	1	0	0	0	0	0	0	0	0	1	0
30	Boulder1-new	river	1	0	0	0	0	1	0	0	0	1	0
30	Catherine-1	river	1	1	0	0	0	0	0	0	0	0	0
30	Dubuque-1	river	1	1	0	0	0	0	0	0	0	0	0
30	Dubuque1-new	river	1	1	0	1	0	0	1	0	0	0	0
30	Ebey-1	river	1	0	0	0	0	0	1	1	0	0	0
30	Ebey-2	river	1	0	1	0	0	0	0	0	0	0	0
30	French-1	river	1	1	0	0	0	0	1	0	1	0	0
30	French-2	river	1	1	0	0	0	0	1	0	1	0	0
30	French-3	river	1	0	0	0	0	0	1	0	1	0	0
30	LittlePilchuck-1	river	1	1	0	0	0	0	0	0	0	0	0
30	LittlePilchuck-2	river	1	1	0	0	0	0	0	0	0	1	0
30	LittlePilchuck-3	river	1	1	0	0	0	0	0	0	0	1	0
30	Pilchuck-1	river	1	1	0	0	0	0	0	0	0	0	0
30	Pilchuck-10	river	1	0	0	0	0	0	1	0	0	0	0
30	Pilchuck-11	river	1	0	0	1	0	0	1	0	1	0	0
30	Pilchuck-12	river	1	0	0	0	0	0	1	0	0	0	0
30	Pilchuck-13	river	1	1	0	1	0	0	0	0	1	0	0
30	Pilchuck-14	river	1	0	0	0	0	0	1	0	0	0	0
30	Pilchuck-16	river	1	0	0	0	0	0	1	0	0	1	0
30	Pilchuck-17A	river	1	0	0	0	0	0	0	0	0	1	0
30	Pilchuck-17B	river	1	0	0	0	0	0	1	0	0	1	0
30	Pilchuck-18	river	1	0	0	0	0	0	1	0	0	0	0
30	Pilchuck-19	river	1	0	0	0	0	0	1	0	0	0	0
30	Pilchuck-2	river	1	1	0	0	0	0	0	0	0	0	0

30	Pilchuck-20	river	1	0	0	0	0	0	1	0	0	1	0
30	Pilchuck-21	river	1	0	0	0	0	0	1	0	0	1	0
30	Pilchuck-3	river	1	1	0	1	0	0	0	0	0	0	0
30	Pilchuck-4	river	1	1	0	0	0	0	1	0	0	0	0
30	Pilchuck-5	river	1	1	0	0	0	0	0	0	0	0	0
30	Pilchuck-6	river	1	0	0	1	0	0	0	0	0	0	0
30	Pilchuck-7	river	1	0	0	0	1	0	0	0	0	0	0
30	Pilchuck-8	river	1	1	0	0	0	0	0	0	0	0	0
30	Pilchuck-9	river	1	0	0	1	1	0	1	0	0	0	0
30	Pilchuck-new	river	1	0	0	0	0	1	0	0	0	1	0
30	Quil1-new	river	1	1	0	0	0	0	0	0	0	0	0
30	Quilceda-1	river	1	1	0	0	0	0	0	0	0	1	0
30	Quilceda-2	river	1	1	0	0	0	0	0	0	0	0	0
30	Quilceda-3	river	1	1	0	0	0	0	1	1	0	0	0
30	QuilWF1-new	river	1	1	0	0	0	0	0	1	0	0	0
30	Snohomish-1	river	1	1	0	1	1	0	1	0	0	0	0
30	Snohomish-2	river	1	1	0	0	1	0	0	0	0	0	0
30	SnohomishEstuary	river	1	1	1	0	1	0	1	0	0	0	0
30	SnohomishMouth-2	river	1	1	0	0	1	0	0	0	0	0	0
30	SnohomishTown-1	river	1	1	0	0	1	0	0	0	0	0	0
30	Steamboat-1	river	1	0	1	0	1	0	0	0	0	0	0
30	Steamboat-2	river	1	0	1	0	1	0	0	0	0	0	0
30	Tulalip1-new	river	1	1	0	1	0	0	0	1	0	1	0
30	Wilson1-new	river	1	0	0	0	0	0	0	0	0	1	0
30	Worthy-1	river	1	0	0	0	0	0	0	0	0	1	0
40	May-1	river	1	1	0	0	0	0	0	0	0	0	0
40	May-2	river	1	1	0	0	0	0	0	0	0	0	0
40	Barclay-1	river	1	1	0	0	0	0	0	0	0	0	0
40	Bear1-new	river	1	0	0	1	0	1	0	0	0	1	0
40	Beckler-1	river	1	0	0	0	0	0	0	0	0	1	0
40	Beckler-2	river	1	0	0	0	0	0	0	0	0	1	0
40	Boulder1-new	river	1	0	0	0	0	0	0	0	0	1	0
40	Carpenter1-new	river	1	1	0	1	0	0	1	1	0	0	0
40	Deer1-new	river	1	0	0	0	0	1	0	0	0	1	0
40	Duffey1-new	river	1	0	0	0	0	1	0	0	0	1	0
40	Elk-1	river	1	0	0	0	0	0	0	0	0	1	0
40	Elwell-1	river	1	0	0	0	0	0	1	0	0	1	0

40	Elwell-2	river	1	0	0	0	0	0	1	0	0	1	0
40	Everett1-new	river	1	0	0	0	0	0	0	0	0	1	0
40	Kelly1-new	river	1	0	0	0	0	0	0	0	0	1	0
40	Marsh1-new	river	1	1	0	0	0	1	0	1	0	1	0
40	May-new	river	1	0	0	0	0	0	0	0	0	1	0
40	McCoy-1	river	1	0	0	0	0	0	0	0	0	1	0
40	McCoy-new	river	1	0	0	0	0	0	0	0	0	1	0
40	Middle1-new	river	1	0	0	0	0	0	0	0	0	1	0
40	NFSkykomish-1A	river	1	1	0	0	0	0	0	0	0	1	0
40	NFSkykomish-1B	river	1	1	0	0	0	0	0	0	0	0	0
40	NFSkykomish-1C	river	1	0	0	0	0	0	0	0	0	1	0
40	NFSkykomish-2A	river	1	0	0	0	0	0	0	0	0	1	0
40	NFWallace-1	river	1	0	0	0	0	0	0	0	0	1	0
40	WilliamsonStony1	river	1	0	0	0	0	0	0	0	0	1	0
40	SultanSF1	river	1	0	0	0	0	0	0	0	0	1	0
40	Olney-1	river	1	0	0	0	0	0	0	0	0	1	0
40	Olney-2	river	1	0	0	0	0	0	0	0	0	1	0
40	Olney-3	river	1	0	0	0	0	0	0	0	0	1	0
40	Olney-4	river	1	0	0	0	0	0	0	0	0	1	0
40	Olney-new	river	1	1	0	0	0	0	0	0	0	1	0
40	Proctor-1	river	1	0	0	0	0	0	0	0	0	1	0
40	Proctor-new	river	1	1	0	0	0	1	0	0	0	1	0
40	ProctorUT-new	river	1	0	0	0	0	0	0	0	0	1	0
40	Rapid-1	river	1	0	0	0	0	0	0	0	0	1	0
40	SFSkykomish-1A	river	1	0	0	1	0	0	1	0	0	0	0
40	SFSkykomish-1B	river	1	0	0	1	0	0	1	0	0	0	0
40	SFSkykomish-2A	river	1	0	0	1	0	0	0	0	0	0	0
40	SFSkykomish-2B	river	1	0	0	1	0	0	0	0	0	0	0
40	SFSkykomish-3	river	1	0	0	0	0	0	0	0	0	1	0
40	Silver1-new	river	1	0	0	0	0	1	0	0	0	1	0
40	Silver2-new	river	1	0	0	0	0	1	0	0	0	1	0
40	Silver3-new	river	1	0	0	0	0	1	0	0	0	1	0
40	Silver4-new	river	1	0	0	0	0	1	0	0	0	1	0
40	Silver5-new	river	1	0	0	0	0	1	0	0	0	1	0
40	Silver6-new	river	1	0	0	0	0	1	0	0	0	1	0
40	Silver7-new	river	1	0	0	0	0	1	0	0	0	1	0
40	Silver8-new	river	1	0	0	0	0	1	0	0	0	1	0

40	Skykomish-1	river	1	1	0	1	1	0	1	0	1	0	0
40	Skykomish-2	river	1	1	0	1	1	0	1	0	1	0	0
40	Skykomish-3	river	1	1	0	1	1	0	0	0	0	0	0
40	Skykomish-3A	river	1	1	0	1	1	0	1	0	0	1	0
40	Skykomish-4	river	1	1	0	1	1	0	1	0	0	0	0
40	Skykomish-5	river	1	0	0	1	0	0	1	0	0	1	0
40	Skykomish-6A	river	1	0	0	1	0	0	1	0	0	1	0
40	Skykomish-7A	river	1	0	0	1	0	0	1	0	0	1	0
40	Skykomish-7B	river	1	0	0	1	0	0	1	0	0	1	0
40	Stony1-new	river	1	0	0	0	0	0	0	0	0	1	0
40	Sultan-1	river	1	0	0	0	0	0	0	0	1	1	0
40	Sultan1-new	river	1	0	0	0	0	0	0	0	0	1	0
40	Sultan-2	river	1	0	0	0	0	0	1	0	1	1	0
40	Sultan2-new	river	1	0	0	0	0	0	0	0	0	1	0
40	Sultan-3	river	1	0	0	0	0	0	0	0	0	1	0
40	Sultan-4	river	1	0	0	0	0	0	0	0	0	1	0
40	Sultan-5	river	1	0	0	0	0	0	0	0	0	1	0
40	SultanSF-new	river	1	0	0	0	0	0	0	0	0	1	0
40	Vesper1-new	river	1	0	0	0	0	0	0	0	0	1	0
40	Wallace-1A	river	1	0	0	1	0	0	0	0	0	0	0
40	Wallace-1B	river	1	1	0	0	0	0	1	0	0	0	0
40	Wallace-2	river	1	1	0	0	0	0	0	0	0	0	0
40	Wallace-2B	river	1	1	0	0	0	0	0	0	0	0	0
40	Wallace-2C	river	1	1	0	0	0	0	0	0	0	0	0
40	Wallace-3	river	1	0	0	0	0	0	0	0	0	1	0
40	Wallace-4	river	1	0	0	0	0	0	0	0	0	1	0
40	NFWallace1-new	river	1	0	0	0	0	0	0	0	0	1	0
40	WFWoods-1A	river	1	0	0	0	0	0	1	0	0	0	0
40	WFWoods-1B	river	1	0	0	0	0	0	1	0	0	0	0
40	WFWoods-2	river	1	0	0	0	0	0	0	0	0	1	0
40	WFWoods-3	river	1	0	0	0	0	0	0	0	0	1	0
40	Williamson1-new	river	1	0	0	0	0	0	0	0	0	1	0
40	Williamson2-new	river	1	0	0	0	0	0	0	0	0	1	0
40	Woods-1A	river	1	1	0	0	0	0	0	0	0	0	0
40	Woods-1B	river	1	1	0	0	0	0	0	0	0	0	0
40	Woods1-new	river	1	0	0	0	0	0	0	0	0	1	0
40	Woods-2A	river	1	0	0	0	0	0	0	0	0	1	0

40	Woods-2B	river	1	1	0	0	0	0	0	0	0	0	0
40	Woods2-new	river	1	1	0	0	0	0	0	1	0	1	0
40	Woods-3	river	1	0	0	0	0	0	0	0	0	1	0
40	Woods3-new	river	1	0	0	0	0	1	0	1	0	1	0
40	Woods-4	river	1	0	0	0	0	0	0	0	0	1	0
40	Woods-5	river	1	1	0	0	0	0	0	0	0	0	0
40	Woods-6	river	1	0	0	0	0	0	1	0	0	1	0
40	Youngs-new	river	1	0	0	0	0	0	1	0	0	1	0
50	Snoqualmie-1A	river	1	0	0	0	0	0	0	0	0	1	0
50	Snoqualmie-1B	river	1	1	0	0	1	0	0	0	0	0	0
60	Sauk-1	river	1	0	0	0	0	0	0	0	0	1	0
60	Sauk1-new	river	1	0	0	0	0	1	0	0	0	1	0
60	Sauk-2	river	1	0	0	0	0	0	0	0	1	1	0
60	Sauk2-new	river	1	0	0	0	0	1	0	0	0	1	0
60	Sauk-3	river	1	1	0	0	0	0	0	0	0	0	0
60	Sauk3-new	river	1	0	0	0	0	1	0	0	0	1	0
60	Sauk4-new	river	1	0	0	0	0	1	0	0	0	1	0
60	SaukSF1-new	river	1	0	0	0	0	1	0	0	0	1	0
60	SaukSF2-new	river	1	0	0	0	0	1	0	0	0	1	0
60	SaukSF3-new	river	1	0	0	0	0	1	0	0	0	1	0
60	Suiattle-1	river	1	0	0	0	0	0	0	0	0	1	0
70	Cherry1-new	river	1	0	0	0	0	0	0	0	0	1	0
70	L-Bear1-new	river	1	1	0	1	0	0	1	1	0	0	0
70	L-Bear2-new	river	1	1	0	1	0	0	1	1	0	0	0
70	L-Bear3-new	river	1	1	0	1	0	0	1	1	0	0	0
70	L-Bear3-new	river	1	1	0	1	0	0	1	1	0	0	0
70	L-Bear3-new	river	1	1	0	1	0	0	1	1	0	0	0
70	North-1	river	1	0	0	1	0	0	0	1	0	0	0
70	Swamp-1	river	1	1	0	0	0	0	1	1	0	0	0

Appendix B: 2010-2015 Detailed Capital Improvement Program

Restoration Projects – Detailed Capital Improvement Program 2010-2015			
Map ID# (Map 13)	Project ID#	Project Name	Functions (See “functions” descriptions in Table 3)
GENERAL COUNTYWIDE PROJECTS			
Project Planning, Design and Management			
	WA361	Preliminary Design & 6 Yr Plan Development	design
	WA7226	River Project Feasibility & Preliminary Design	design
	WA9299	Admin. & OH, Major River CIP	mgmt
	WA399	Admin. & OH, Stream Enhancement CIP	mgmt
	WA390	Stewardship Design	Design
	JE13203	Sustainable Agriculture/Restoration Planning	Planning
Countywide Projects and Materials			
	WA9225	CIP Salmon Plan Implementation	habitat
22	WA7220	Beaver Management	habitat
23	WA362	Native Plant Restoration Projects	habitat
1	113RFNP	Native Plant Support to Cty Rd Projects	Habitat (HRF)
	WA7215	Restoration Materials	habitat
24	WA9212	Riparian Improvements	habitat
25	JE113RF	County Road Fish Blockage Culverts	fish passage
Monitoring and Maintenance			
	WA9226	Monitoring - Restoration Project Establishment	monitor
	WA393	Project Monitoring and Maintenance	monitor
4	WA9014	Prop Mgt Skyview	maintenance
WATERSHED-SPECIFIC RESTORATION PROJECTS			
Lake Washington-Cedar-Sammamish WRIA 8 / South County			
8	WA3003	Brightwater Habitat Mitigation	Mitigation
7	WA3000	Brightwater Culverts	Mitigation (HCS)
9	WA3008	BW Culvert #6	Mitigation (HRF)
16	WA8561	North Creek – Clearwater School	Habitat (HRF)
Snohomish River Basin			
	132SNO	Snohomish Salmon Recovery	Habitat (HRF)
	DIP031	Fish Passage – Snohomish	Connectivity
3	JE113NS	Nearshore Assessment Feasibility and Prelim. Design	Habitat (HRF)
21	JE113PL	Pilchuck Assessment Feasibility and Prelim. Design	Habitat (HRF)
10	WA3020	Lk Stevens DNR Habitat Projects – Kuhlman Ck	Habitat (HRF)
12	WA3024	Richardson Creek Restoration	Habitat (HRF)
17	JE13204	Snohomish Estuary Pacific Treaty Funds	Habitat (HRF)
15	WA8560	Lundeen Creek (LS UGA) CIDI	Connectivity
5	WA9206	Smith Island Restoration Project	Habitat (HRF)

6	WA9218	Braided Reach (Sites 2&3)	Habitat (HRF)
20	WA9227	Lower Sky Reach Prelim Design	Habitat (HRF)
Stillaguamish Basin			
	132STI	Salmon Restoration – Stillaguamish	Habitat (HRF)
2	JE113KP	Kayak Point Restoration	Habitat (HRF)
11	WA3023	NF Big Trees	Habitat (HRF)
13	WA3027	Jarsk Creek	Habitat (HRF)
14	WA396	SF Big Trees	Habitat (HRF)
	WA539	Stilly Discretionary Projects	Habitat (HRF)
18	WA9202	North Meander Restoration	Habitat (HRF)
19	WA9232	SF Stilly ELJ Project	Habitat (HRF)

Project No.	Project Name	2010	2011	2012	2013	2014	2015	6 Yr. Totals
113RFNP	Native Plant Support to Cty Rd Projects	\$50,000	\$50,000	\$50,000	\$50,000	\$50,000	\$50,000	\$300,000
JE113KP	Kayak Point Restoration	\$70,000	\$0	\$0	\$0	\$0	\$0	\$70,000
JE113NS	Nearshore Assessment Feasiblity and Prelim. Design	\$31,240	\$120,000	\$0	\$0	\$0	\$0	\$151,240
JE113PL	Pilchuck Assessment Feasibility and Prelim. Design	\$98,149	\$90,000	\$0	\$0	\$0	\$0	\$188,149
JE113RF	County Road Fish Blockage Culverts	\$85,449	\$415,000	\$415,000	\$415,000	\$415,000	\$415,000	\$2,160,449
WA3000	Brightwater Culverts	\$453,588	\$300,000	\$240,000	\$140,000	\$50,000	\$50,000	\$1,233,588
WA3003	Brightwater Habitat Mitigation	\$1,609,000	\$1,850,000	\$1,260,000	\$860,000	\$130,000	\$118,172	\$5,827,172
WA3008	BW Culvert #6	\$85,232	\$0	\$0	\$0	\$0	\$0	\$85,232
WA3020	Lk Stevens DNR Habitat Projects - Kuhlman Ck	\$11,282	\$10,000	\$15,000	\$15,000	\$0	\$0	\$51,282
WA3023	NF Stilly Big Trees	\$96,641	\$79,521	\$90,000	\$0	\$0	\$0	\$266,162
WA3024	Richardson Creek Restoration	\$24,843	\$0	\$0	\$0	\$0	\$0	\$24,843
WA3027	Jarsk Creek	\$195,749	\$0	\$0	\$0	\$0	\$0	\$195,749
WA361	Preliminary Design & 6 Yr Plan Dev	\$37,119	\$67,480	\$87,000	\$87,000	\$87,000	\$87,000	\$452,599
WA362	Native Plant Restoration Projects	\$98,231	\$95,233	\$95,000	\$95,000	\$95,000	\$95,000	\$573,464
WA390	Stewardship Design	\$4,606	\$34,023	\$30,000	\$30,000	\$30,000	\$30,000	\$158,629
WA393	Project Monitoring and Maintenance	\$14,122	\$67,800	\$68,000	\$68,000	\$68,000	\$68,000	\$353,922
WA396	SF Stilly Big Trees	\$91,641	\$92,521	\$87,000	\$0	\$0	\$0	\$271,162
WA399	Admin. & OH, Stream Enhancement CIP	\$215,546	\$200,000	\$200,000	\$200,000	\$200,000	\$200,000	\$1,215,546
WA539	Stilly Discretionary Fund Projects	\$5,734	\$39,000	\$47,500	\$47,500	\$47,500	\$47,500	\$234,734
WA7220	Beaver Management	\$39,227	\$40,000	\$40,000	\$40,000	\$40,000	\$40,000	\$239,227
WA8560	Lundeen Creek (LS UGA) CIDI	\$4,824	\$12,601	\$15,000	\$15,000	\$15,000	\$0	\$62,425
WA8561	North Creek - Clearwater School	\$396,765	\$50,000	\$50,000	\$0	\$0	\$0	\$496,765
132SNO	Snohomish Salmon Recovery	\$0	\$80,000	\$150,000	\$225,000	\$300,000	\$300,000	\$1,055,000
132STI	Stillaguamish Salmon Recovery	\$0	\$50,877	\$136,300	\$183,300	\$198,300	\$213,300	\$782,077
JE13203	Sustainable Agriculture/ Restoration Planning	\$161,723	\$8,763	\$0	\$0	\$0	\$0	\$170,486
JE13204	Snohomish Estuary Pacific Treaty Funds	\$475,000	\$0	\$0	\$0	\$0	\$0	\$475,000
WA7215	Restoration Materials	\$64,045	\$123,198	\$125,000	\$125,000	\$125,000	\$125,000	\$687,243
WA7226	River Project Feasibility and Preliminary Design	\$42,678	\$106,199	\$150,000	\$175,000	\$200,000	\$200,000	\$873,877
WA9014	Prop. Mgmt Skyview	\$185,799	\$163,616	\$10,000	\$10,000	\$10,000	\$10,000	\$389,415
WA9202	North Meander Restoration	\$11,900	\$0	\$0	\$0	\$0	\$0	\$11,900
WA9206	Smith Island Restoration Project	\$548,460	\$4,000,000	\$4,000,000	\$1,800,000	\$200,000	\$0	\$10,548,460
WA9212	Riparian Improvements	\$35,198	\$41,688	\$100,000	\$100,000	\$100,000	\$100,000	\$476,886
WA9218	Braided Reach (Sites 2 &3)	\$316,634	\$100,000	\$0	\$0	\$0	\$0	\$416,634
WA9225	CIP Salmon Plan Implementation	\$24,820	\$33,300	\$50,000	\$50,000	\$50,000	\$50,000	\$258,120
WA9226	Monitoring Restoration Project Establishment	\$16,234	\$16,000	\$16,000	\$16,000	\$16,000	\$16,000	\$96,234
WA9227	Lower SkyReach Prelim Design	\$46,930	\$100,000	\$200,000	\$190,000	\$0	\$0	\$536,930

WA9232	SF Stilly ELJ Project	\$296,898	\$0	\$0	\$0	\$0	\$0	\$296,898
WA9299	Admin. & OH, Major River CIP	\$98,383	\$100,000	\$100,000	\$100,000	\$100,000	\$100,000	\$598,383
TOTALS		\$6,043,690	\$8,536,820	\$7,826,800	\$5,036,800	\$2,526,800	\$2,314,972	\$32,285,882

Appendix C: Snohomish County Marine Resources Program

Surface Water Management Division

The county partners with NOAA Fisheries, the Tulalip and Stillaguamish Tribes and others to inventory and monitor habitat in the Snohomish and Stillaguamish River estuaries and nearshore areas. Similarly, county habitat staff support the Snohomish County Marine Resources Advisory Committee (MRC) in habitat monitoring and evaluation. The MRC has partnered in several analyses on Snohomish County's nearshore, such as the Intertidal Habitat Mapping Project, and the Snohomish County Nearshore Candidate Sites Analysis for Protection and Restoration.

Marine Resources Program

The primary goal of Surface Water Management's Marine Resources Program is to protect and restore the marine waters, habitats, and species off the shores of Snohomish County. We investigate marine resource-related concerns and recommend remedial actions to local authorities and property owners.

Technical Assistance

Surface Water Management staff is available to provide technical assistance, advice and ideas to shoreline landowners on issues related to:

- Bluff management
- Bulkheads and softshore armoring
- Riparian vegetation
- Marine life
- Water quality
- Beach restoration

The Marine Resources Program has implemented a variety of projects recommended by the MRC, including: surveys of forage fish spawning areas and juvenile Dungeness crab habitat; outreach and education activities; water quality monitoring; and various types of beach restoration projects. Generally, the projects fall into four categories:

- Dungeness Crab Stewardship
- Nearshore Habitat Protection
- Marine Water Quality
- Education and Outreach

Dungeness Crab Stewardship Projects

- **Derelict Gear Removal**

Partners: Northwest Straits Commission (NWSC)

Description: Develop a pilot recovery program to locate, prioritize, and remove derelict fishing gear in Puget Sound.

Project Status: Ongoing

- **Dungeness Crab Escape Cord**

Partner: WSU Beach Watchers

Description: Promote the use of "escape cord" by recreational crabbers. Escape cord is biodegradable cotton cord that will dissolve over time if a crab pot is lost, allowing trapped crabs and other marine species to escape. Over 700 escape cord cards have been given to crabbers in 2006. Download our Escape Cord Poster (304 Kb PDF).

Project Status: Ongoing; Current Lead: WSU Beach Watchers

- **Gravid Female Dungeness Crab Habitat Study**

Partners: Tulalip Tribes

Description: Develop a comprehensive map identifying gravid female crab habitat in Snohomish County by conducting underwater surveys to locate gravid females and identifying habitat types selected.

Project Status: Current 2008

- **Juvenile Dungeness Crab Habitat Study (Details)**

Partners: Washington State Department of Fish & Wildlife, WSU Beach Watchers, Edmonds Community College, Tulalip Tribes, Stillaguamish Tribe.

Goal: Determine the preferred habitats and tide heights at which juvenile Dungeness crabs settle at along the Snohomish County shoreline.

Project Status: Complete 2007

- **Escape Cord Degradation Study**

Partners: Port Townsend Marine Science Center

Description: Determine rates of degeneration of crab pot escape cord; determine catch rates and survival times for entrapped crabs in derelict pots.

Project Status: Completed 2006

- **Dungeness Crab Harvest**

Partners: Washington Department of Fish & Wildlife

Description: Compile harvest data and estimate the harvest pressure on Dungeness crab offshore of Snohomish County.

Project Status: Completed 2006

- **Discussions with Crab Trap Manufacturers**

Partner: WSU Beach Watchers

Description: Determine the barriers for crab trap manufacturers including information on escape cord with their crab traps.

Project Status: Completed 2006

Nearshore Habitat Protection

Protection of the nearshore habitat of Snohomish County is a priority for the Marine Resources Program for many reasons. The nearshore area serves as critical habitat for shellfish, forage fish, salmon, marine mammals and seabirds. Alteration of nearshore habitat is one of the most pressing threats to the Puget Sound ecosystem.

Projects:

- **Kayak Point County Park Restoration**
Partners: Snohomish County Parks and Recreation, People for Puget Sound, WSU beach Watchers, Snohomish-Camano Nearshore Cooperative
Description: Conduct a feasibility and design study to assess the potential for beach/backshore restoration enhancement and develop design alternatives for the 150ft bulkhead along the southwestern shoreline.
Project Status: Current 2008
- **Jetty Island Beach Expansion Monitoring**
Partners: Pentec Environmental, Port of Everett
Description: Evaluate the success of using dredged Snohomish River sands to extend the length of Jetty Island as essential habitat. Five profile monitoring surveys using volunteers will occur in order to determine changes in elevation and slope, rates of sediment erosion and accumulation, and rates of colonization by vegetation.
Project Status: Ongoing 2007-2008
- **Candidate Sites Analysis**
Partners: Northwest Straits Commission
Description: Identify candidate sites for protection and restoration of marine resources within the marine nearshore area of Snohomish County. For each site, narrative site descriptions are provided, potential projects highlighted, and conclusions/recommendations are given.
Project Status: Delayed; 80% complete
- **Osprey Nest Relocation**
Partners: Pilchuck Audubon Society, Tulalip Tribes, WA Department of Natural Resources
Description: Install concrete pilings to replace nesting sites for the osprey population in Port Gardner Bay to ensure long-term survival of the colony after future removal of creosote pilings by the WA Department of Natural Resources.
Project Status: Current 2008
- **Creosote Survey & Removal**
Partners: WSU Beach Watchers and WA Department of Natural Resources
Description: Survey all Snohomish County public beaches for creosote logs and remove creosote logs at "hot spots" in the County, such as on Jetty Island.
Project Status: Ongoing
- **Picnic Point/Kayak Point Stewardship - Sound Stewards**
Partners: People For Puget Sound
Description: Coordinate with People For Puget Sound to recruit and train Sound Stewards volunteers to design a restoration management plan at Picnic Point and Kayak Point.
Project Status: Ongoing
- **Shore Stewards Program**
Partners: WSU Beach Watchers

Description: Educate shoreline residents about the issues pertinent to shoreline and encourage them to be responsible landowners.

Project Status: Ongoing

- **Landowner Workshops**

Partners: Puget Sound Partnership, WSU Beach Watchers, Snohomish County Public Works, Stillaguamish Tribe, Tulalip Tribes, People for Puget Sound, and Rosary Heights Nunnery, City of Everett, City of Edmonds, City of Mukilteo, and others.

Description: Half-day workshops to educate shoreline landowners on issues such as landslides, vegetation on slopes, natural lawn care, and low impact development.

Project Status: Ongoing

- **Forage Fish Spawning Habitat Survey**

Partners: WA Department of Fish and Wildlife, Northwest Straits Commission

Description: Identifying and mapping sand lance, surf smelt, and pacific herring spawning habitat along the Snohomish County nearshore.

Project Status: Map developed 2004; Anticipated surveys in future.

- **Eelgrass Mapping and Protection ([Link to maps](#))**

Partners: Tulalip Tribes and Stillaguamish Tribe

Description: Compile GIS data on intertidal eelgrass and conduct eelgrass surveys below the intertidal zone along the Snohomish County shoreline.

Project Status: Map developed 2007

- **Photopoint Monitoring Study**

Partners: Northwest Straits Commission

Description: Determine future changes in shoreline vegetation at Picnic Point and Kayak Point.

Project Status: Ongoing

- **Marine Shore Inventory**

Partners: Northwest Straits Commission

Description: Collected data on Snohomish County marine shore conditions, such as physical habitat structure, hydromodifications, outfalls, riparian vegetation, and intertidal vegetation.

Project Status: Completed 2003

Marine Water Quality

Marine water quality is a new priority for the Marine Resources Program. Current projects are intended to assess and respond to marine water quality issues in Snohomish County.

Marine water quality is essential to human health and to supporting marine ecosystems.

Projects:

- **Marine Water Quality Assessment**

Partners: Northwest Straits Commission

Description: Conduct an analysis of existing water quality programs and identify water quality data gaps along the Snohomish County shoreline.

Project Status: Ongoing

- **Mussel Watch Program**

Partners: National Oceanic and Atmospheric Administration (NOAA), Stillaguamish Tribe, WSU Beach Watchers, ORCA

Description: Monitor marine water quality by sampling mussels at identified locations on the Snohomish County shoreline, and analyzing their tissues for over 100 different chemical contaminants (45 PAHs, 37 PCBs, 24 pesticides, 10 persistent organic compounds, and 17 trace metals).

Project Status: Ongoing

- **Pharmaceutical Take-Back Program (PH:ARM)**

Partners: Snohomish County Solid Waste Management Division, Pacific Northwest Pollution Prevention Resource Center, WA Department of Ecology, King County Local Hazardous Waste Management Program, Washington Citizens for Resource Conservation, and more.

Description: Coordinate a one-day workshop to determine ways to expand the pilot pharmaceutical take-back program statewide. Research and identify key stakeholders from organizations such as hospitals, pharmacies, environmental groups, and law enforcement agencies.

Project Status: Ongoing

- **Monitoring Endocrine Disrupters in Salmon**

Partners: Stillaguamish Tribe, National Oceanic and Atmospheric Administration (NOAA)

Description: Research the impacts of endocrine disrupting chemicals on salmonids by sampling wild and hatchery Chinook salmon to measure levels of the protein Vitellogenin (Vtg) in their blood.

Project Status: Completed 2007

Additional Education and Outreach

Projects:

- **Beach Expos**

Partners: WSU Beach Watchers and Stilly-Snohomish Fisheries Enhancement Task Force.

Description: Educate the public on issues related to local marine life and ecology. Beach Naturalists will be on the beach educating the public, and local marine life will be on display. These events are free and open to the public.

Project Status: Ongoing – in summers

- **Clean-up Events – Day of Caring**

Partners: Snohomish-Camano Nearshore Cooperative

Description: Shoreline cleanup and planting events

Project Status: Ongoing

Appendix D: Drainage Needs and Water Quality Programs

Surface Water Management Division Drainage Needs Program

In December 2002, a team of Snohomish County staff and consultants completed a two-year study that inventoried existing drainage systems and evaluated stormwater drainage problems and solutions in the County's rapidly growing urban growth areas (UGAs). This ambitious project, called the Drainage Needs Report Project, involved the assessment of drainage needs throughout the County's unincorporated UGAs. The results provide a wealth of information and new tools that the County, local cities, developers, and citizens alike can use to make decisions on drainage related issues. These tools are designed to answer questions not only today but also in the future, as conditions change.

Products of the Drainage Needs Report Project

The inventory of 73 square miles of existing drainage systems - mapped for the first time (includes 15 square miles of inventory conducted prior to the DNR project and 58 square miles of inventory conducted during the DNR project).

- The identification of over 1,000 existing and future surface water problems.
- A list of 378 priority projects with conceptual designs.
- The development of hydrologic and hydraulic models for a number of the major conveyance systems.
- Eleven individual Drainage Needs Reports for individual study areas.
- A Summary Report for the entire DNR Project.

The benefits of the DNR Project

- The County can better maintain and repair drainage systems it owns or manages.
- Residents can have a better understanding of drainage systems in their neighborhoods.
- The County and other local governments can prioritize drainage system investments and better coordinate with other regional projects.
- Developers have access to new information and hydrologic/hydraulic models for conducting downstream analyses as part of the permitting process.
- Emergency responses to contaminant spills can trace downstream drainage paths more quickly.
- Aquatic habitat and water quality can be better protected.

2010 Project Highlights

Drainage Improvement - 18th Ave. West

Project Funding: This project is funded by SWM UGA Surcharge Funds.

Project Location: Approximately 17215 18th Ave. West. [Link to map.](#)

Project Description: This project will reduce/eliminate county road and private property flooding. Work will include minor re-grading of a roadside ditch/stream and replacement of segments of the

existing undersized drainage system (7 catch basins and approximately 380 feet of storm sewer pipe). A Hydraulic Project Approval was issued by the Washington Department of Fish and Wildlife for this project. The project was identified through the Drainage Needs Report Project and the Surface Water Management drainage complaint and investigation program.

19th Avenue NE Culvert Replacement

Project Funding: The project is funded by SWM/WMA funds.

Project Location: 25130 19th Avenue NE. [Link to map.](#)

Project Description: The project will reduce road flooding and erosion by replacing a 12" diameter culvert with a 24" diameter culvert, installing an inline drop structure to dissipate energy before discharging into the stream, and realigning the stream away from roadway edge to prevent further erosion. An Housing Planning Area (HPA) has been issued for the project. The project was identified through the Surface Water Management drainage complaint and investigation program.

46th Drive South East Detention Facility Retrofit

Funding: This project is funded by Surface Water Management fees.

Project Location: 12305 46th Drive SE. [Link to map.](#)

Project Description: This project involves converting the existing "back up" style of stormwater detention pond into a "flow thru" style of storm water detention pond to improve function and water quality. The project was identified through the Surface Water Management drainage complaint and investigation program.

8th Place West Drainage Improvement

Project Funding: The project is funded by SWM/WMA Funds.

Project Location: 23433 8th Place West. [Link to map.](#)

Project Description: Project installs a drainage layer and underdrains to intercept high ground water percolating to surface and flowing over sidewalk and through asphalt into driving lanes. Project includes removing approximately 180 lf of road surface to install a drainage layer and underdrains and replacing approximately 400 lf of existing (failed) interceptor trenches behind the sidewalks.

Three Lakes Road Culvert Replacement

Project Funding: This project is funded by the Road Fund.

Project Location: 14006 Three Lakes Road. [Link to map.](#)

Project Description: This project replaces twin 24" diameter corrugated metal pipe culverts that are rusted and failing with a larger 71" x 103" fish passable metal arch pipe culvert. Geosynthetic wrapped headwalls will be constructed on each end of the pipe to create additional road shoulder. The project will reduce upstream property flooding.

Culvert Replacement at 22522 Woods Creek Road

Project Funding: This project is funded by the Road Fund.

Project Location: Near 22522 Woods Creek Road. [Link to map.](#)

Project Description: The project replaces an existing culvert draining at the top of an eroded road embankment with 93 lineal feet of combined 24" culvert and slope drain pipe to convey the water to the bottom of the steep embankment. An energy dissipater will be installed at the outlet of the slope drain pipe. The purpose of the project is to prevent continuous erosion of the road embankment and to alleviate road flooding.

209th Avenue SE Drainage Improvement

Project Funding: The project is funded by SWM/UGA surcharge funds.

Project Location: 13300 Block of 209th Ave. SE. [Link to map.](#)

Project Description: Replace approximately 750 feet of existing undersized, failing 12-inch and 18-inch diameter storm drain system within the plat of Monroe Terrace, with 30-inch and 36-inch diameter storm drain. The project will reduce private property and road flooding and prevent infiltration of septic leachate into the storm drain. A drainage easement is being created over the new system in order to allow future County maintenance. The project was identified through the Surface Water Management, Drainage Needs Report.

32nd Avenue West Drainage Improvement

Funding: This project is funded by SWM/UGA Surcharge Funds (South County UGA).

Project Location: 15200 32nd Avenue West. [Link to map.](#)

Project Description: This project involves replacement of an existing undersized and failing 12" to 18" diameter storm sewer system with a larger 24" diameter storm sewer system. The project was identified through the Surface Water Management drainage complaint and investigation program.

Menzel Lake Road Culvert Replacement

Funding: This project is funded by SWM UGA Surcharge Funds (Granite Falls UGA).

Project Location: 20600 Menzel Lake Road. [Link to map.](#)

Project Description: This project involves replacement of an existing undersized and failing 36" diameter culvert with a larger 12' x 24' CMP single radius arch pipe. The size of the new culvert was governed by Washington Department of Fish and Wildlife requirements for fish passage. The project was identified through the Surface Water Management drainage complaint and investigation program.

Water Quality Facility Plan (WQFP) Program

Surface Water Management (SWM) is currently developing a Water Quality Facilities Plan to improve water quality in County drainage systems. SWM is starting with a pilot study in the Silver Creek watershed and plans to expand to other areas of the county in the future.

► The purpose of the WQFP program is to:

- Recommend specific drainage projects and maintenance actions that can be used to improve water quality, particularly projects and actions that the County can do,

such as projects within public road rights-of-way.

- Implement the higher priority drainage projects and maintenance actions as County funding allows.
- Help fulfill the requirements of the County's federal stormwater permit, known as the [NPDES permit](#).

► WQFP Pilot Study: Silver Creek Watershed

The WQFP program will eventually include other parts of the county, but for now SWM is focusing on a portion of the North Creek watershed, specifically the area within the Silver Creek basin. SWM has developed some pilot project ideas for this area that would improve water quality in the County's drainage system by enhancing existing ditches, road edges, and curbs in County road rights-of-way with Natural Drainage features, such as rain gardens.

Silver Creek Pilot Projects

Starting in 2009, Surface Water Management (SWM) plans to conduct a WQFP pilot study in the Silver Creek watershed. This study will involve:

- Collecting citizen input on the design and location of proposed pilot projects,
- Recommending drainage projects and maintenance actions that the County can complete to improve water quality,
- Implementing pilot projects as funding allows, and
- Using study results to guide work in other areas of the county.

The Silver Creek WQFP pilot study will assess both traditional and innovative techniques to manage and treat stormwater runoff. It will include the installation of Natural Drainage features, taking advantage of natural processes wherever possible to minimize disruptions to natural water movement.

Natural Drainage Features

Proposed pilot projects in the Silver Creek watershed include one or more of the following Natural Drainage features:

- Rain gardens
- Rain garden terraces
- Soil amendments
- Vegetated strips
- Pervious pavement
- Reduced pavement
- Vegetated swales
- Roadside ditch amendments

Please see the pilot project summaries posted at the following link to see proposed projects that incorporate these features.

http://www1.co.snohomish.wa.us/Departments/Public_Works/Divisions/SWM/Work_Areas/Urban_Drainage/WQFP.htm